gfirst LEP
growing gloucestershire

Gloucestershire Five Foundations of Productivity Evidence Report

Contents

Gloucestershire Local Industrial Strategy

Shared Intelligence was commissioned by GFirst Local Enterprise Partnership (LEP) to produce an up-to-date baseline of economic data for Gloucestershire.

The information provided in this document has been prepared in alignment with the government's Industrial Strategy, considering the component parts of the national strategy. This data pack draws on analysis from a range of data sets as set out in appendix 1, and where relevant, additional qualitative evidence received by GFirst LEP, under the five foundations of productivity:

People – population, demography, skills, economic activity and inactivity. The government ambition is to 'generate good jobs and greater earning power for all'.

Ideas – investment in R&D, new product and service development. The ability to create new ideas and deploy them is essential to becoming 'the world's most innovative economy'.

Infrastructure – highlighting the major infrastructure in the county, both physical and digital. This is key to understanding the conditions that hinder business performance.

Business Environment – understanding our sectors and business base, entreprenuerialism and employment demand. The ambition is to become 'the best place to start and grow a business'.

Place – understanding how a prosperous place can not only drive productivity but also deliver inclusive growth across the whole geography.

Covering Gloucestershire as a whole, it identifies differences in districts and sets out LEP comparators where relevant and possible. It includes data relating to Gloucestershire and its districts of Cheltenham, Cotswold, Forest of Dean, Gloucester, Stroud and Tewkesbury where data at these levels exists.

It is intended that this provides a baseline to inform Local Industrial Strategy development. It provides information that can be examined further with stakeholders to explore the challenges and opportunities for raising productivity in Gloucestershire.

Executive Summary

Productivity

Gloucestershire produced £16.488bn of economic output in 2017, representing 12.6% of the output of the South West region, 1.08% of the total output for England, and 0.92% of the total output for the UK. In addition, Gloucestershire ranks 13th of 38 LEPs in terms of productivity per worker.

Gloucestershire GVA per filled job stood at £51,664 in 2017, which was above the South West average (£46,888) but 4.9% below the national average (£54,330). Factors underpinning this position have been explored through this evidence base to understand key local drivers of and barriers to productivity growth in Gloucestershire.

Age and skills

Gloucestershire, like most of the UK, has an ageing population. The local dynamic is unlike neighbouring places in that Gloucestershire has the highest share of 50–64-year-olds of all neighbouring areas, has declining resident workforce availability and is also a net exporter of 18–24-year-olds. While the proportion of people in the labour market with higher skills has grown, Gloucestershire has not attracted higher level skills to the same extent as some neighbouring areas, or matched the expansion seen nationally in higher skills. Qualitative evidence from local companies supports the view that mature talent in the area supports high value engineering and consultancy sectors – and to some extent the age profile represents a trade-off in terms of mature skills and younger talent, with much of the current workforce due to reach retirement age in the next few years. Supporting continued productivity growth will require access to both deep and wide labour market talent pools, and the strategic challenge of ageing is likely to represent a constraint on this possibility. However, Gloucestershire has a healthier older population than many comparable areas, offering people the opportunity to continue to work later in life.

£16.488 billion
economic output in 2017

12.6%
Output of South West Region

1.08%
Total output for England

0.92%
Total output for the UK
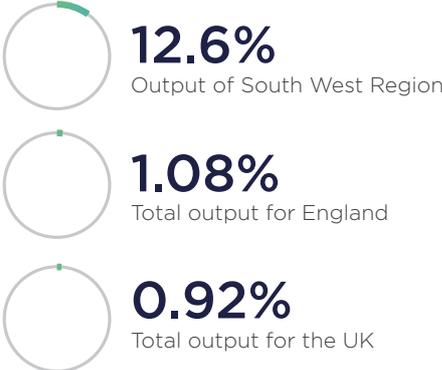
STEM and apprenticeships

Technical and vocational skills are of particular importance to the Gloucestershire economy with potential to address the particular skills shortage vacancies faced as STEM provision and apprenticeship delivery has expanded[1]. 7.5% of labour demand is for specific STEM occupations representing just under 23,000 roles. Gloucestershire ranks above average (16 of 38) for STEM employment but faces a challenge in that it does not produce STEM graduates at a large enough scale locally to support the employment base and is relatively poor at graduate retention in relation to local comparator areas.

Apprenticeship delivery numbers for the recent year suggest a strong expansion of delivery so far for 2019, including the expansion of higher standards and new progression routes from intermediate and advanced frameworks. Initial data from Q2 2018–19 suggests a 35% growth in take up of higher-level apprenticeships on the previous year, and although these have not yet translated into 'completions', there appears to be a significant expansion in this skills pipeline. However, delivery is highly concentrated in four of ten frameworks and there is potential to target provision more closely at productivity skills shortages.

Comparative revealed advantage

The primary revealed comparative advantage[2] for Gloucestershire is in the industrial sector of 'manufacturing services'[3] for the advanced engineering sector. Gloucestershire is home to an important cluster of product manufacturing inputs including hydraulics, valves, pumps, and associated electronic components. Large co-located aviation companies such as GE aviation and Safran Landing Systems are able to draw on a cluster of technical expertise and combine input components from the local cluster to produce high value export products with associated services requirements. Located primarily in the district of Tewkesbury, this cluster is also able to draw on the dense labour and skills markets of Cheltenham and Gloucester.

Also related to the advanced engineering manufacturing cluster is an innovation cluster and smaller scale export specialism around hydraulics mining and drilling for oil and gas exploration. This cluster is located around Stroud, with good access to the M5.

A third cluster with a notable location quotient for local activity is the agriculture and food manufacturing sector, with double the national proportion of activity in the sector. Food manufacturing is the UK's most significant manufacturing sector. This activity is able to draw on strong local institutional innovation assets, and an associated finding is that farm diversification is providing alternative non-agricultural employment space that supports potential for co-location, micro-clustering and cross-sector pollination effects in rural districts.

A potential emerging sector which bears further investigation is the recent strong growth in new models of business support classified as 'other business support not elsewhere classified'. This is an emerging micro-sector linked to the strong computer consultancy and management consultancy cluster in the county. Further investigation is required, but the evidence suggests that this business support is related to cyber-defence capabilities associated with proximity to GCHQ[4], and that there are emerging business specialisms in data security that complement the growth in data-intensive business sectors.

---

1   For example, the Gloucestershire STEM Network and University of Gloucestershire STEM strategy 2017–22. Hartpury University and College and Cirencester College also focus on STEM.

2   The revealed comparative advantage is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows. It is based on the Ricardian comparative advantage concept.

3   That is, not just the physical product but the [higher associated requirement for] skills and expertise associated with design, installation, maintenance, repair etc.

4   The timing of falls in 'defence' employment in Cheltenham in fact coincides very neatly with growth in this sector, suggesting some level of 're-classification', perhaps due to the expanded provision of services to the private sector.

Key Place assets and innovation institutions

Themes emerging from the research suggest that cross-cutting issues will require innovative partnership activity to address, and Gloucestershire has a number of key partnership assets which could be drawn together to facilitate an augmented approach for greater impact.

Cotswold Area of Outstanding Natural Beauty (AONB) has links to funding programmes and convenes the Cotswold Ecological Networks forum which has 60 members representing 33 organisations including local authorities, community organisations, landowners, the private sector and conservation organisations.

Alongside Gloucestershire Wildlife Trust and others, these partnerships represent large existing economic benefits, including tourism and ecological services. They will need to be part of discussions moving forward, so that the right balance is struck between economic development and its impacts, in support of the clean growth agenda. This will help to preserve and enhance valuable natural capital, support public health and enhance quality of life – factors increasingly important to business investment and decision making.

GCHQ is the UK's national cyber security and communications centre and has created a large pool of skills and talent with benefits that also spill over into finance, computing and management-consultancy, micro-business and high-growth sectors. GCHQ runs engagement initiatives such as demonstrating new technologies at the Cheltenham science festival and sponsoring entrepreneurship programmes in local schools. In terms of talent engagement and retention, there may be further scope for GCHQ to support talent networks for spinouts and engage with local education providers as broader activity around cyber and AI-data sectors progresses.

The University of Gloucestershire can further support this potential through links to national HE and postgraduate networks beyond Gloucestershire, for example in Worcestershire, Oxfordshire and Buckinghamshire who also have particular cyber-specialisms.

Hartpury University and College and the Royal Agricultural University deliver both general and specialist skills relevant to Gloucestershire's businesses as well as significant research and innovation support in agri-tech. There is further potential to understand how they can meet the demands of shifting employment trends and technological advances. Further, areas such as the Forest of Dean may have significant future economic and innovation potential, facing different trade-offs to Cotswold District in terms of existing activity and stakeholders. Skills delivery partners will need to be involved in considering how this may impact demand and opportunities for students in future.

Gloucestershire Airport and the associated high value aviation cluster underpin significant value chains in the area. Assets such as Gloucestershire Airport have significant existing stakeholder interests, and understanding what activity is needed to anchor and build on these, and how new (e.g. mass transit) infrastructure can unlock future growth – without disrupting existing value chains – will require constructive partnership.

Partnership structures that can support necessary and constructive conversations between those mentioned here, and other interests will be explored as part of the next stages of Local Industrial Strategy development and delivery.

Small and micro business growth performance

Business formation, entrepreneurialism and start-up rates are high in Gloucestershire, and a healthy overall growth dynamic can be observed in terms of employee and business growth, though with weaker recent performance. The benefits of deep skills networks in surrounding areas such as Bristol and Oxfordshire provide growth businesses with access to mature skills but scaling up is proving challenging, as seen in the business structure of the area. Growth dynamics in these neighbouring areas have out-paced Gloucestershire, but this represents an opportunity for the future. Convergence with more dynamic neighbours is unlikely without addressing specific localised place constraints, however opportunities to harness the 'pull-through' effect from proximity to high-level industrial capabilities will continue to be explored.

The evidence has highlighted variations in performance between districts, with Cotswold and Cheltenham performing more strongly, possibly by harnessing a stronger set of skills and business environment assets. Locations such as Gloucester, which show less strong performance, have spare capacity and are likely to see greater dynamism as infrastructure and regeneration investment provide improved settings for scaling and growth spill-overs. The repurposing of traditional industrial stock and innovative rural and home working settings across the districts have potential to unlock further dynamism.

Across the county, though with important local trends, three relatively distinct groups of growth sectors can be observed, with knowledge intensive and micro-business sectors of ICT, professional scientific and technical leading performance. The numbers of micro-businesses in knowledge sectors are also driving private sector innovation activity in terms of the number of firms involved. This suggests there is potential for innovation networks and clusters to become stronger through networking.

Quality of Place and constraints

Gloucestershire is located in the South West region of the UK, between Birmingham to the north, Bristol to the south, Herefordshire and Wales to the west and Oxfordshire to the east. The county also offers fast connections to London. The connectivity Gloucestershire offers to other parts of the UK is likely to be a factor in the success of the county, particularly in comparison to much of the South West. However, within the county, rural connectivity is often poor – public transport services connecting smaller settlements are infrequent and usage is generally low.

The county has a high quality of life, with a highly paid mature workforce and good access to green spaces. These green spaces play a key role in the £1bn Cotswold tourism sector across the Cotswold AONB area (of which 64% is in Gloucestershire). This is significant in supporting the competitiveness of the AONB in terms of skills retention and clustering, entrepreneurialism, business formation and growth sector attraction. However, there have been historical barriers to the scaling of businesses in AONB locations and this represents a constraint on clustering and productivity growth.

Cultural infrastructure, the quality of the built and natural environment, and digital infrastructure are strong assets supporting a high quality of Place in Gloucestershire, though with some important differences between districts. Gloucester, Stroud and Tewkesbury districts appear less constrained in terms of the ability to host mid-to-large sized businesses, including high value engineering and manufacturing in Tewkesbury and Stroud. However, the conditions for micro-business and entrepreneurial activity could be further strengthened in these locations. For example, across the more rural parts of the county, it is often difficult to walk and cycle to work, which can be a factor in young graduate retention. Building on strengths and addressing constraints at a highly localised level will underpin Gloucestershire's strategy to address its part of the productivity puzzle faced across the UK.

Productivity in Gloucestershire

The ONS has compared annual estimates of labour productivity for the G7 developed countries (Canada, France, Germany, Italy, Japan, UK and US) up to 2016. Comparability across countries is achieved by using estimates of GDP and labour inputs from a common source (the Statistics Directorate of the Organisation for Economic Co-operation and Development (OECD)). This provides the best data available for international comparisons.

Fig0.1 shows international comparative performance showing that when compared with the rest of the G7, the UK had a lower output per worker and output per hour worked in 2016. In terms of GDP per worker the greatest difference was with the US, while in terms of GDP per hour worked, the greatest difference was with Germany. Japan was the only G7 country that had a lower level of productivity than the UK across both measures.

In International Comparisons of UK Labour Productivity by Industry (2014) output per hour is relatively poorer across Knowledge based industries in particular. Public administration, Finance and insurance, Professional scientific and technical sectors, and Information and communication sectors all trail in the bottom third of EU27 comparative productivity rankings.

Gloucestershire GVA per filled job stood at £51,664 in 2017, which, as with GVA per hour worked, was above the South West average (£46,888) but 4.9% below the national average of £54,330.

Fig 0.1 Productivity of G7 countries indexed to UK, 2016

Legend: Per hour worked, Per worker

Y-axis: Porductivity compared to UK baseline index of 100

UK = 100

X-axis: Japan, Canada, UK, Italy, G7 exc. UK, US, France, Germany
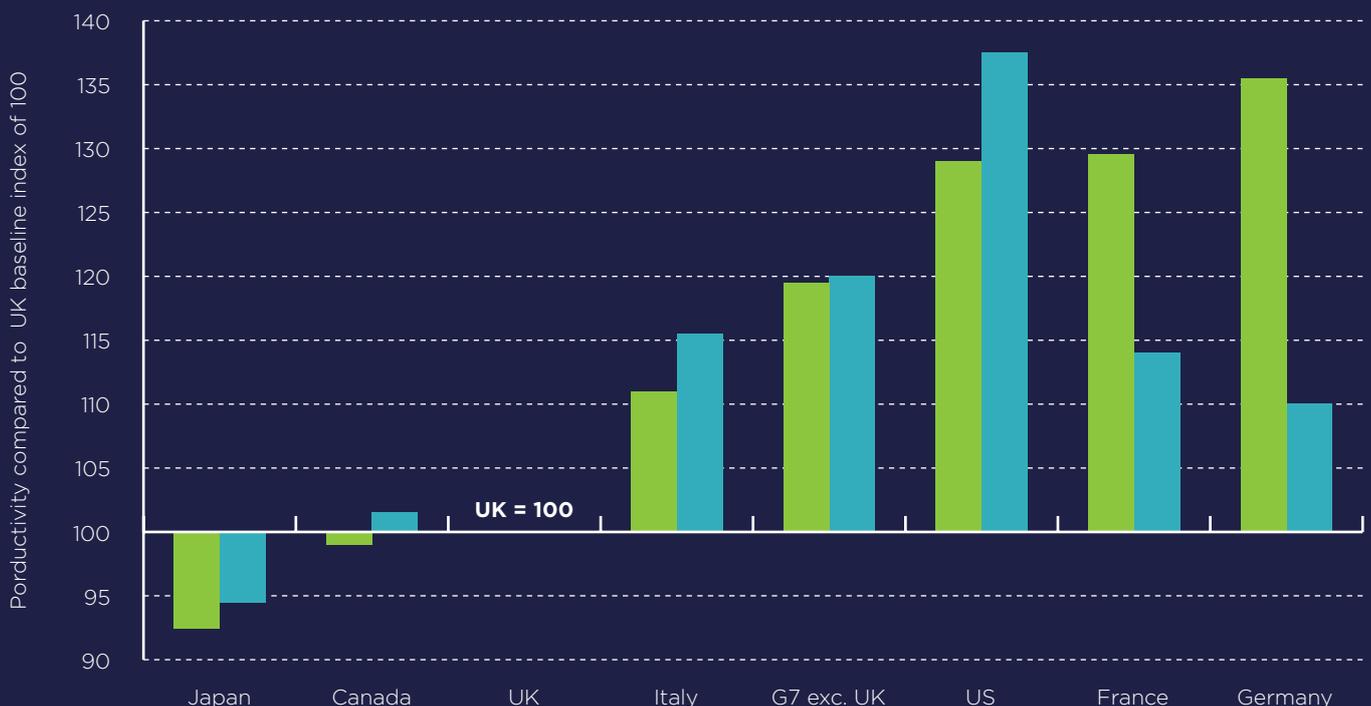
Fig0.2 shows that when compared with other LEPs, Gloucestershire ranks 13th out of 38 (1 having the highest GVA per filled job). Of those Local Enterprise Partnership areas that have a higher GVA per filled job than Gloucestershire, the majority (7 out of 12) are located in London and the wider south east. The exceptions are the West of England, Cheshire and Warrington, Coventry and Warwickshire, South East Midlands and Oxfordshire.

Gloucestershire has generally followed the national trend in output per hour worked and per worker, with growth in productivity prior to the recession, followed by several years of limited growth, which has since been followed by a return to growth. (Source: The Gloucestershire Productivity Puzzle, Gloucestershire County Council)

Fig 0.2 Gross Value Added per filled job at LEP Level, 2017

— UK
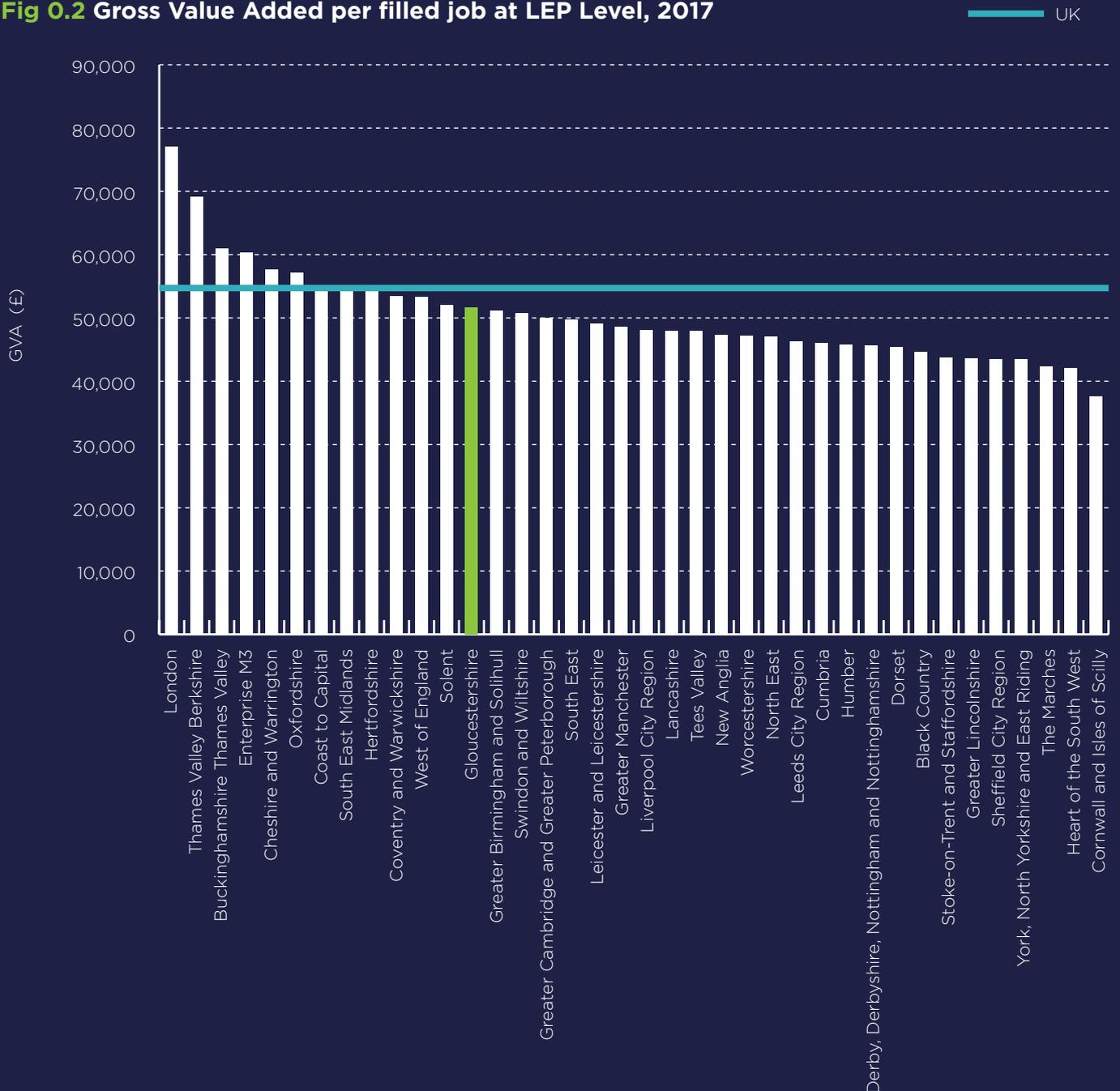
People

People Summary

1. Population growth in Gloucestershire is average and in line with the regional and national rate of growth since 2010. Within this there is a falling share of 16–64-year-olds as a percentage of the total population (2.5%). This fall in share is entirely driven by additional 65+ share growth (2.5%). There is also a net inflow of economically active 30–44-year-olds as well as an inflow of children under the age of 15.

2. Gloucestershire has a slightly lower percentage of those aged 65+ than the South West region, but the highest share of 50–64-year-olds of all LEP neighbours or comparators. This is driven by a bulge of those aged 50–52 in particular.

3. People are active for longer, with higher economic activity rates for the 50–64 age group, but with increased reliance on part-time roles to support 'phased' retirement. Younger workers in Gloucestershire are also more likely to be employed full-time than the 50–64 age group.

4. There is a smaller percentage of those aged 20–24 in Gloucestershire compared to similar areas; and Gloucestershire is a net exporter of 18–24-year-olds. Students in Gloucestershire are somewhat concentrated in Gloucester, and to a lesser extent in and around Cirencester (Cotswold District).

5. Both full-time and part-time residential earnings are below the national level in Gloucestershire.

6. People from the EU are the largest non-UK-born demographic and make up between 37% (Cotswold) and 47% (Tewkesbury) of non-UK-born residents in Gloucestershire districts.

Please note that in a number of the charts, the data is informed by a small sample size which raises questions of its robustness. Where this data has been included, confidence levels are low and so limited weight has been put on the interpretation. It has been highlighted where this is the case in the text and the reference appendix.

Population and Age Overview and Change 2010 to 2017

The total population of Gloucestershire in 2017 was 628,139. This includes 112,723 people aged 0–15, 383,204 aged 16–64 and 132,212 aged 65+.

Since 2010 this has increased by 34,042, or 5.7%. This 5.7% is in line with both the regional and national rate of population increase in the period.

Fig1.1 shows the contribution of the six districts to the total increase.

Fig1.2 shows the scale in absolute terms of the 0–65+ population in each of the six districts, noting the population composition for each.

Fig 1.1 Districts contributions to Gloucestershire population change 2010–17

Legend:
- Cheltenham
- Cotswold
- Forest of Dean
- Gloucester
- Stroud
- Tewkesbury

Values (top to bottom): 2,227 · 4,061 · 4,895 · 5,639 · 8,423 · 8,797
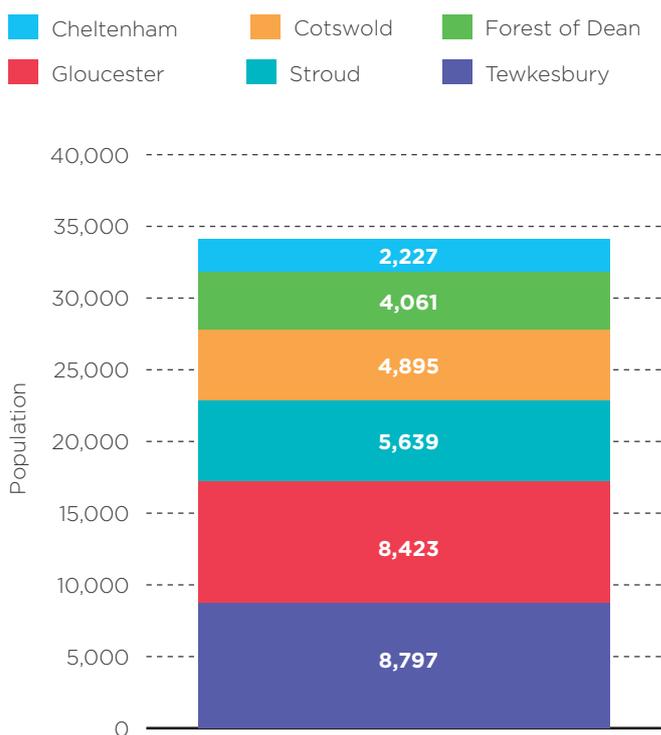
Fig 1.2 Total population of the six Gloucestershire districts, 2017

Aged 0–15 Aged 16–64 Aged 65+
(The numbers shown on the bars are for the working age population)

District	Working age population
Cheltenham	74,247
Cotswold	51,218
Forest of Dean	51,211
Gloucester	81,926
Stroud	70,802
Tewkesbury	53,800
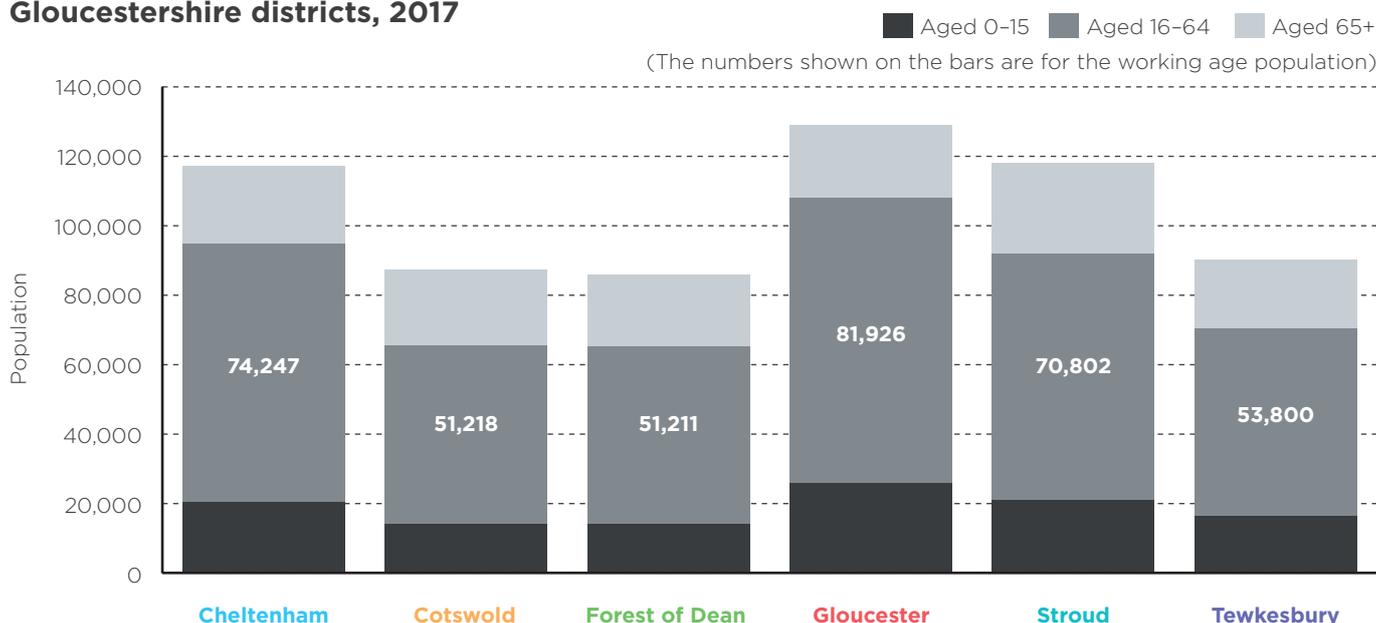
Fig 1.3 Age groups as a percentage of total population, Gloucestershire districts, 2017

■ Aged 0–15 ■ Aged 16–64 ■ Aged 65+

Cheltenham — 19%, 18%, 63%

Cotswold — 25%, 16%, 59%

Forest of Dean — 24%, 16%, 60%

Gloucester — 16%, 20%, 63%

Stroud — 22%, 18%, 60%

Tewkesbury — 22%, 18%, 60%

Gloucestershire — 21%, 18%, 61%
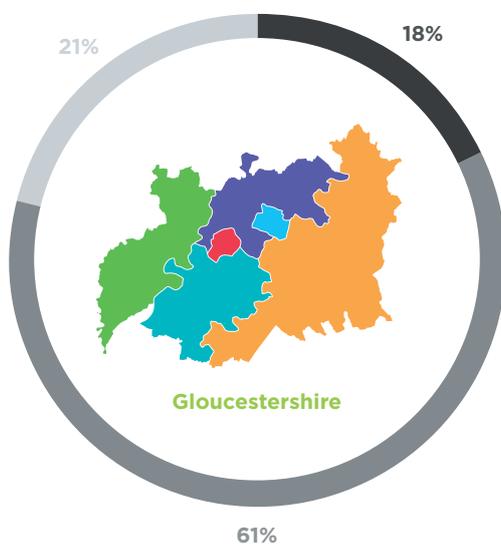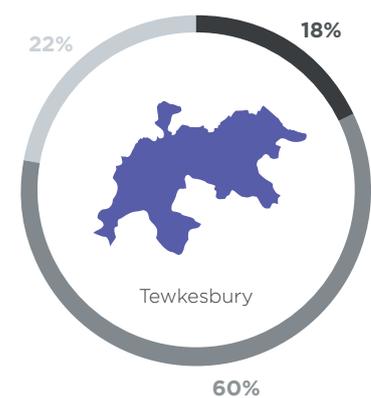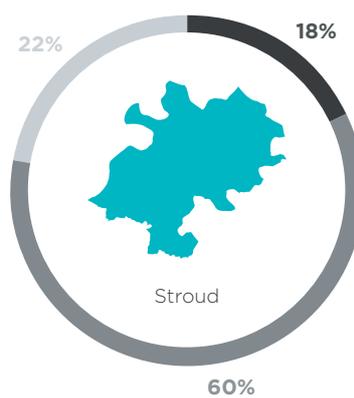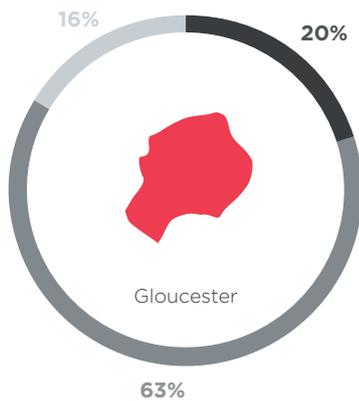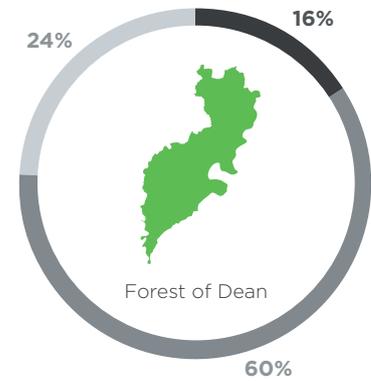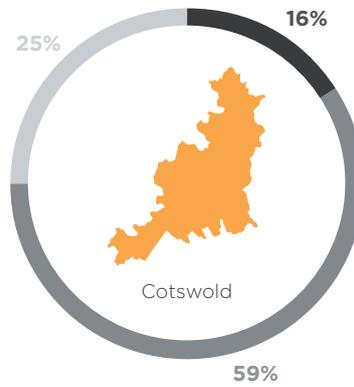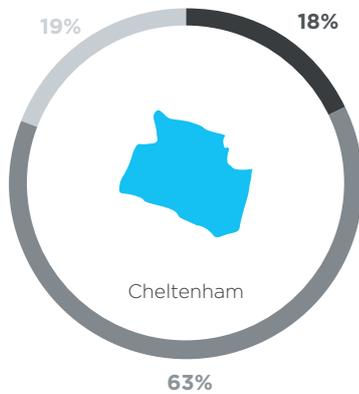
Fig1.3 shows the balance in percentage terms between the 0–15-year-old population, the working age population, and the over 65 population. For comparative purposes:

- The population in the urban centres of Gloucester and Cheltenham is younger than the population in the rural districts, with 20% of the population in Gloucester being aged 0–15.

- 25% of the Cotswold population is 64+, while in Gloucester and Cheltenham the figure is 16% and 19% respectively.

- The 16–64 population of the districts is roughly consistent, although Cotswold has the lowest share at 59% while Gloucester has the highest at 63%.

Fig 1.4 Per cent +/- gain/loss in population share by age group, Gloucestershire and districts, 2010–17
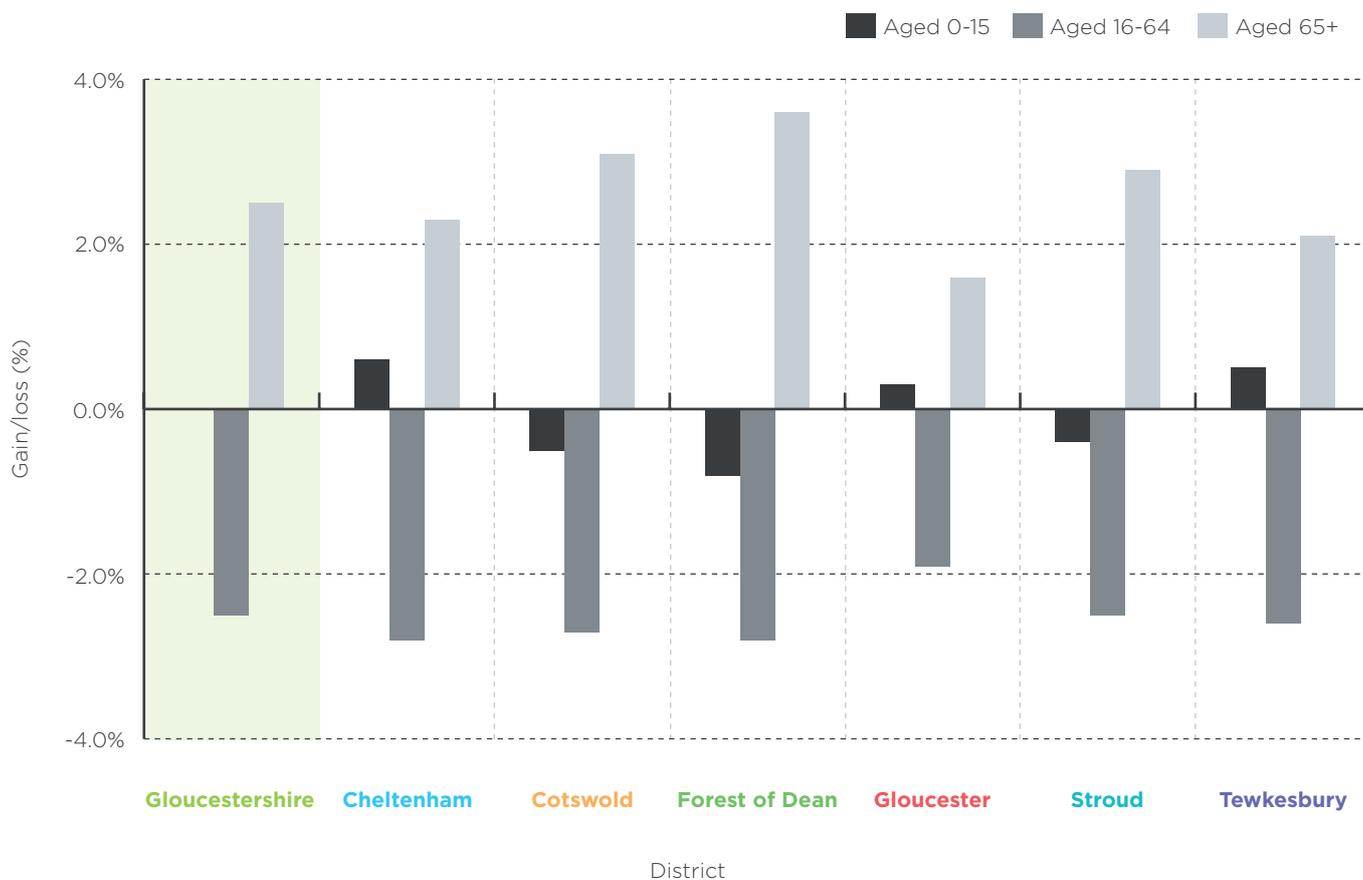
Fig1.4 highlights the changing composition of population in terms of the balance of the three broad age groupings:

1. Those aged 0–15 have maintained their share of the total population at 18%; losing a margin of the total share in three districts and gaining a margin of the total share in three others.

2. The share of those aged 16–64 has declined by 2.5% across Gloucestershire, and by as much as 2.8% in Cheltenham and the Forest of Dean. In Cheltenham this has also corresponded to a decrease in the absolute number of residents aged 16–64 (-1,730).

3. Meanwhile, the share of those aged 65+ has grown in all six districts and by an average of 2.5% across the LEP area. The total increase in absolute terms was 22,250.

A Detailed Breakdown of Age in Gloucestershire

Fig 1.5 Population breakdown by age for Gloucestershire, comparator LEP areas, and the South West, 2017

Legend:
- Gloucestershire
- Oxfordshire
- Swindon and Wiltshire
- West of England
- Worcestershire
- South West
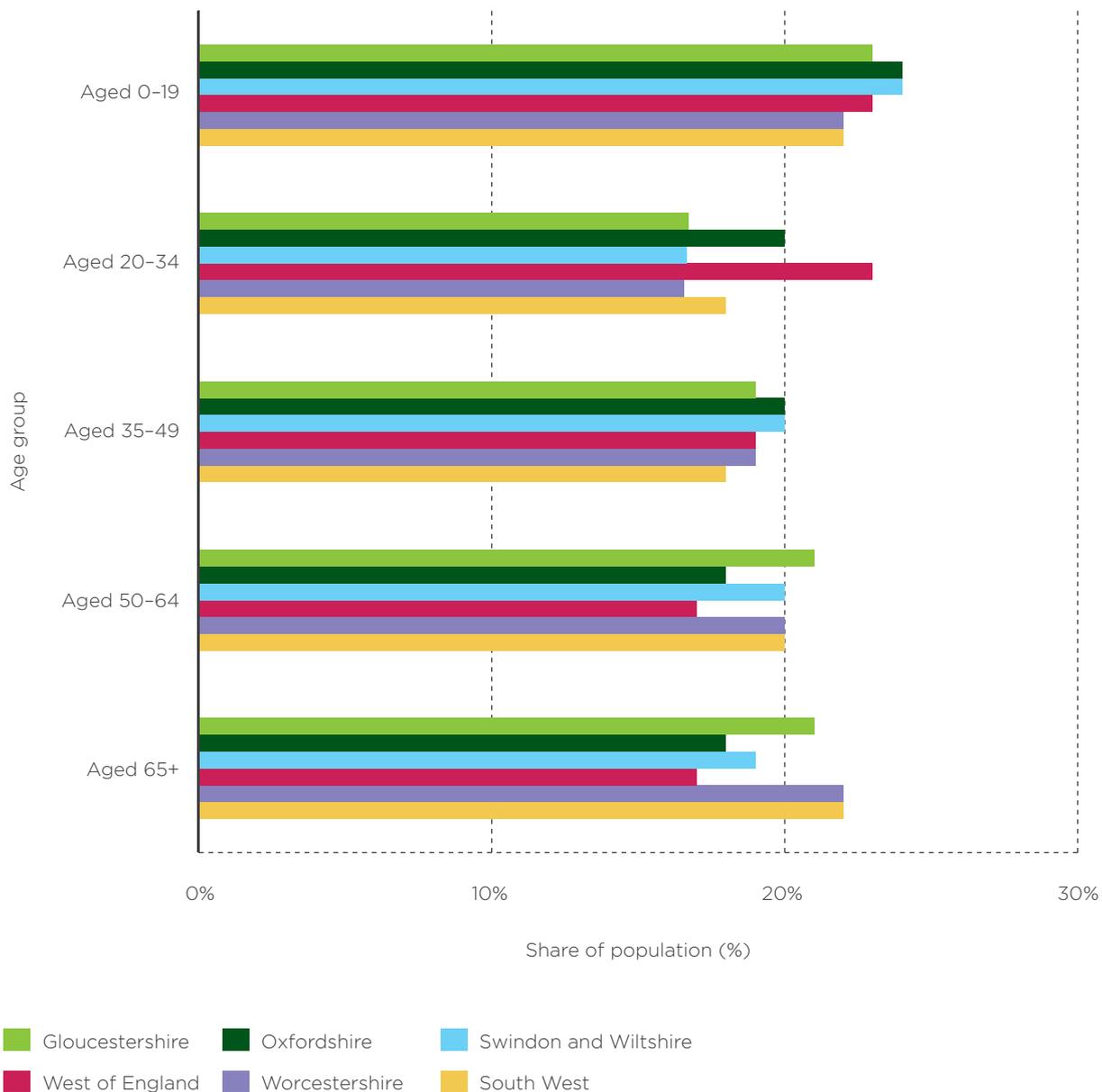
Fig1.5 confirms that Gloucestershire's population is somewhat skewed towards older age groups compared to the South West region as a whole, and markedly so when compared to the West of England in particular. Of particular significance is the markedly smaller proportion of the 20–34 age group within Gloucestershire in comparison to the South West.

Each successive age group makes up more of the share, with the share of 50–64-year-olds in Gloucestershire making up about 20% of the population, the second highest share, more than the average for the South West (and England – not shown in Fig 1.5).

Fig 1.6 Age distribution for Gloucestershire by one year age brackets, 2017

Legend: England Female, Gloucestershire Female, England Male, Gloucestershire Male

Total population (%)
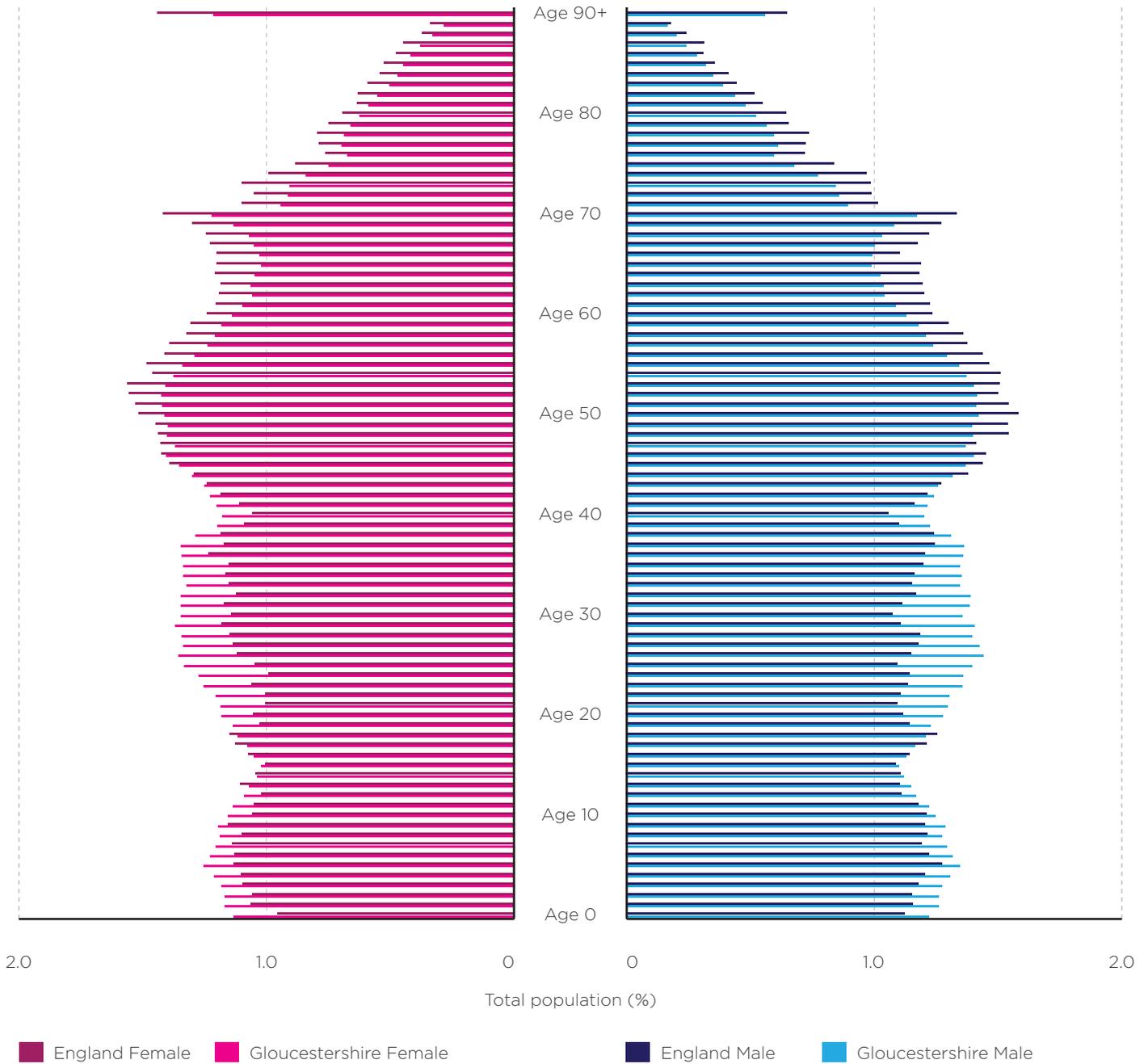
Fig1.6 shows the breakdown of people by age within Gloucestershire. There is a spike in population at the early 50s (50 years old for men and 52 for women). This peak also makes up the single largest age group within Gloucestershire. The size of this population, and the fact that it has been fairly static in size as the people have increased in age, suggests that Gloucestershire may face the issue of declining worker availability in the next 15 years as this group approaches retirement age.

This figure also shows a trough in the number of people from the age of 18 to 25. This group is the most economically mobile, and at the lower end are likely to attend university in significant numbers. Further, Gloucestershire is not attracting young people aged 20–34, particularly compared to neighbouring areas like the West of England and Oxfordshire as demonstrated by the disparity on Fig1.5. However, as previously established in Fig1.3, there is a slight disparity between the higher proportion of young people that live in urban districts and the lower proportion who live in rural districts.

Fig 1.7 Life expectancy at birth by district within Gloucestershire, 2017
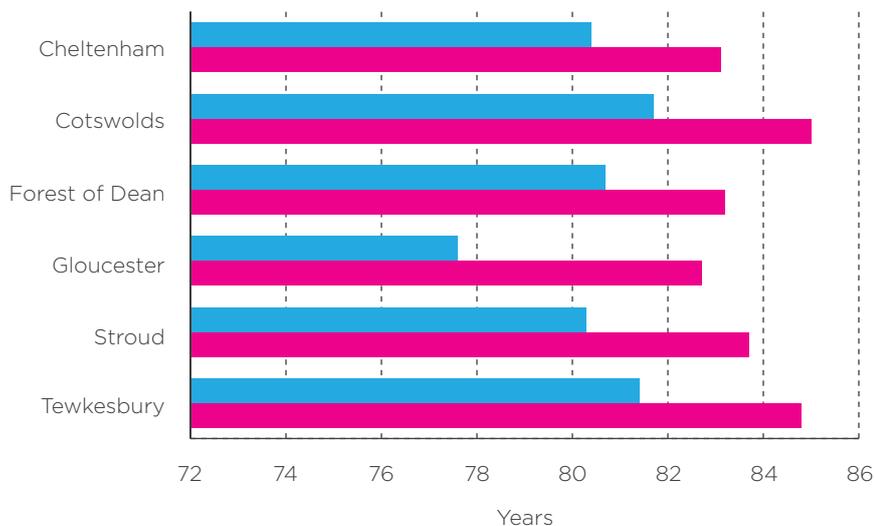
Fig1.7 shows that Gloucester has a lower life expectancy for men than any other district within Gloucestershire. The female life expectancy for Gloucester is more closely aligned with other districts, although still the lowest.

Men
Women

Fig 1.8 Life expectancy at birth for Gloucestershire, surrounding LEPs, the South West and England, 2017
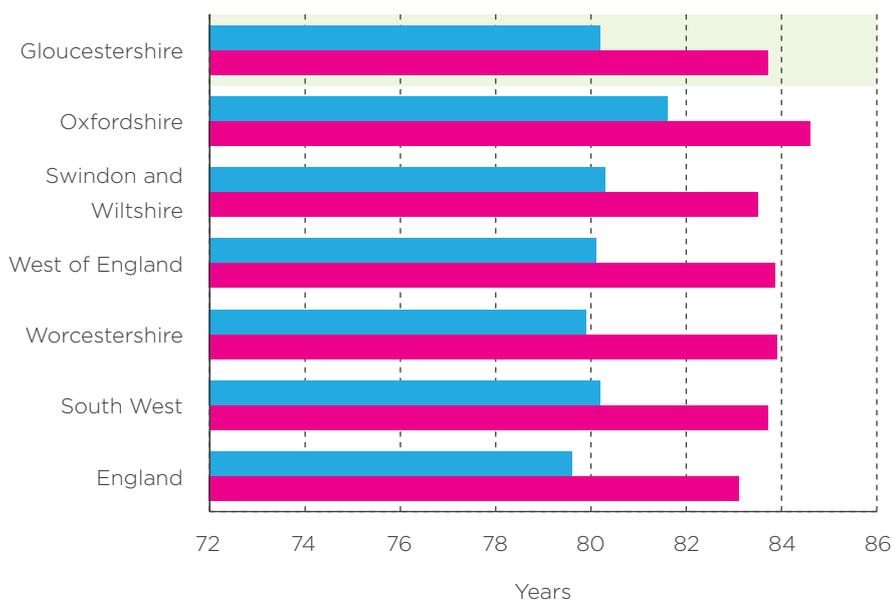
Fig1.8 shows that Gloucestershire has slightly higher life expectancy than neighbouring LEPs, for both men and women, similar to the average for the South West, but above the average for England.

Men
Women

Fig 1.9 Healthy and disability-free life expectancy for Gloucestershire at birth, 2017
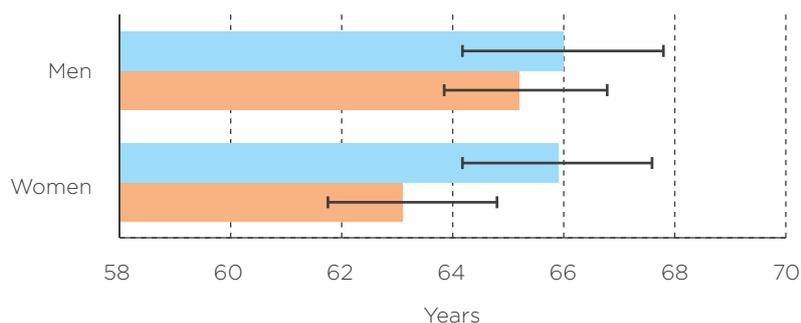
Fig1.9 shows that new-borns in Gloucestershire can expect to have a healthy life expectancy of around 66 years, with a disability-free expectancy slightly lower.[5]

Healthy Life Expectancy (HLE)

Disability Free Life Expectancy (DFLE)

5   For help interpreting error bars please see Appendix 2

Population Projections for Gloucestershire

The ONS population projections for 2016–2041 reveal that population growth in Gloucestershire is expected in all districts. This ranges from 8.44% projected growth over the period for Cheltenham (from 117,200 to 128,000) to 17.37% for Tewkesbury (88,500 to 107,100).

Fig 1.10 Absolute predicted population increase by age group ('000), 2016–41

Legend: 0–19, 20–34, 35–49, 50–64, 65+
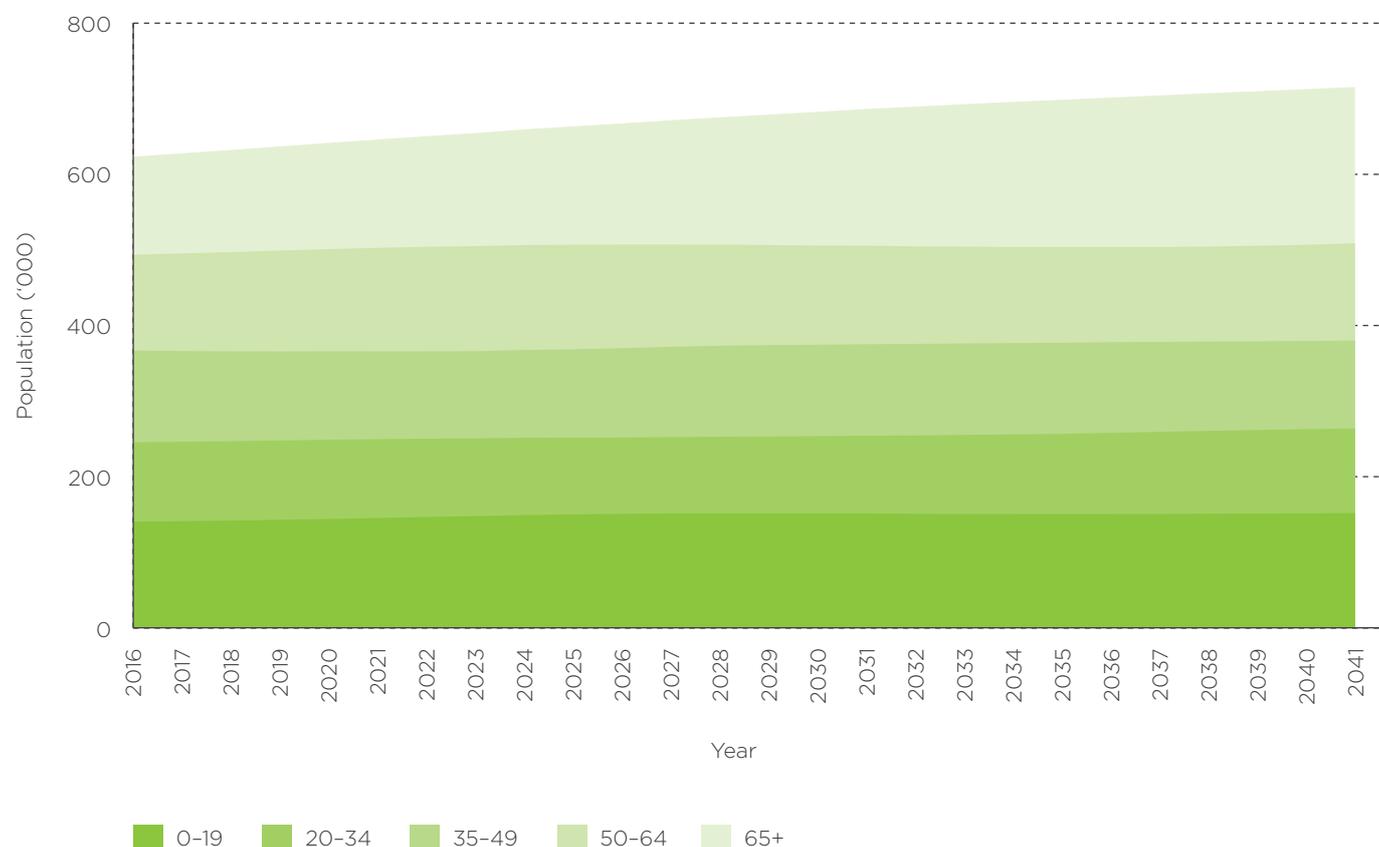
Fig1.10 shows that the growth in population within Gloucestershire is expected to be about 14.81%, growing from 623,100 people to 715,400 people. In real terms, only the 35–49 age group is expected to see a fall in population, falling by 4.29% from 121,300 people to 116,100 people. The other age groups are expected to see an increase in population, with the 0–19 age group seeing an expected 8.10% increase from 140,600 to 152,000 people, the 20–34 age group a 6.5% increase from 105,000 to 111,900 people, and the 50–64 age group a 1.58% increase, from 126,700 to 128,700 people. However, the 65+ age group is expected to see a 59.37% increase over the period, increasing from 129,700 to 206,700 people.

Fig 1.11 Proportion by age group 2016 and predicted 2041 proportion

Legend:
- 0–19
- 20–34
- 35–49
- 50–64
- 65+
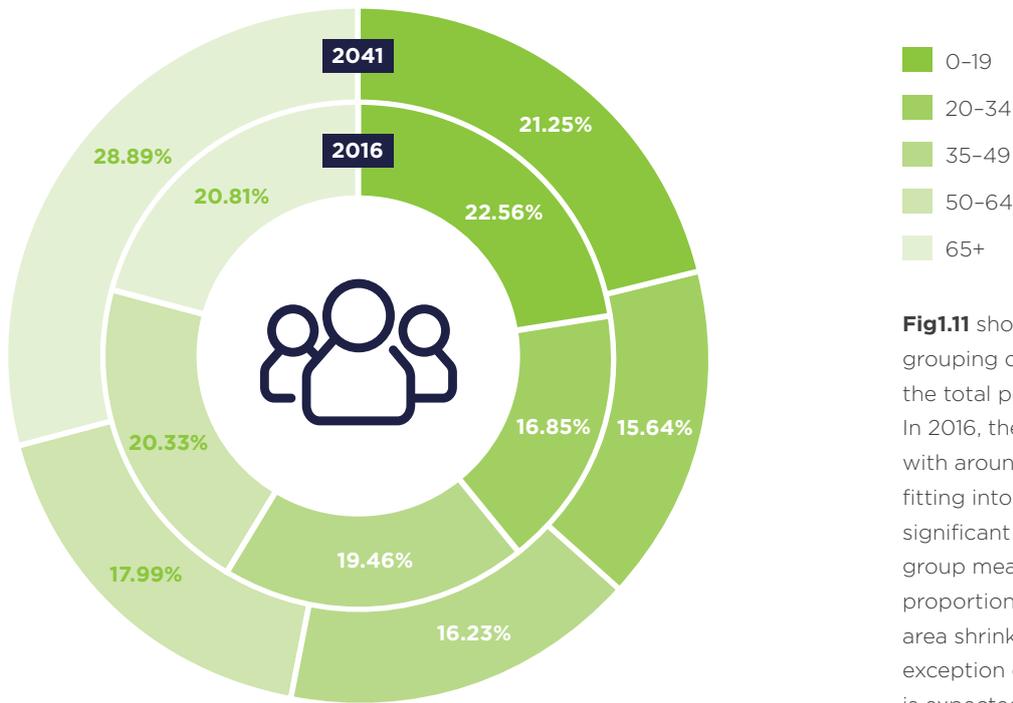
Fig1.11 shows the proportion of each grouping of ages as a percentage of the total population of Gloucestershire. In 2016, the share is roughly split with around 20% of the population fitting into each bracket. However, the significant growth in the over 65 age group means that, comparatively, the proportion of all age groups in the area shrinks over the period with the exception of the 65+ age group, which is expected to take up 28.89% of the total in 2041.

Fig 1.12 Indexed predicted population growth for LEPs, 2016–41

Legend:
- Gloucestershire
- Oxfordshire
- Swindon and Wiltshire
- West of England
- Worcestershire
- South West
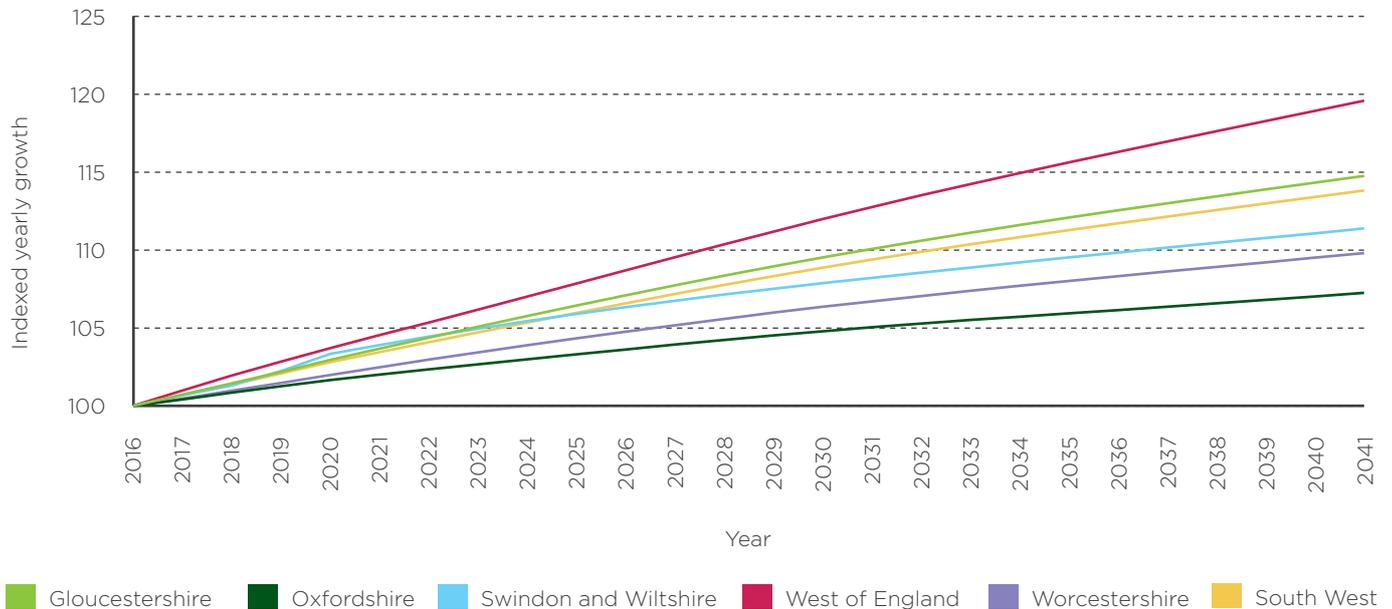
Fig1.12 shows that Gloucestershire is expected to grow faster than all LEP comparator areas with the exception of the West of England, when growth is indexed to 2016. The predicted rate of growth for Gloucestershire at 14.81% is higher than the predicted rate of growth for both the South West and England, at 13.86% and 12.09% respectively. With high growth comes the need for housing and infrastructure for the extra people, as well as an increased amount of provision for the very significant increase in the population over the age of 65.

Domestic Population Trends to 2035

While the overall population of Gloucestershire is expected to increase by about 92,300 people between 2016 and 2041, looking more closely at the working age population reveals a somewhat different picture. The working age population (16–64-year-olds) is projected to increase by only around 6,936 people, which equates to a growth of 1.8%. This increase is lower than the regional and national averages of 3.1% and 3.6% respectively.

Fig 1.13 Annual net change in Gloucestershire's 16–64-year-old population, 2016–41
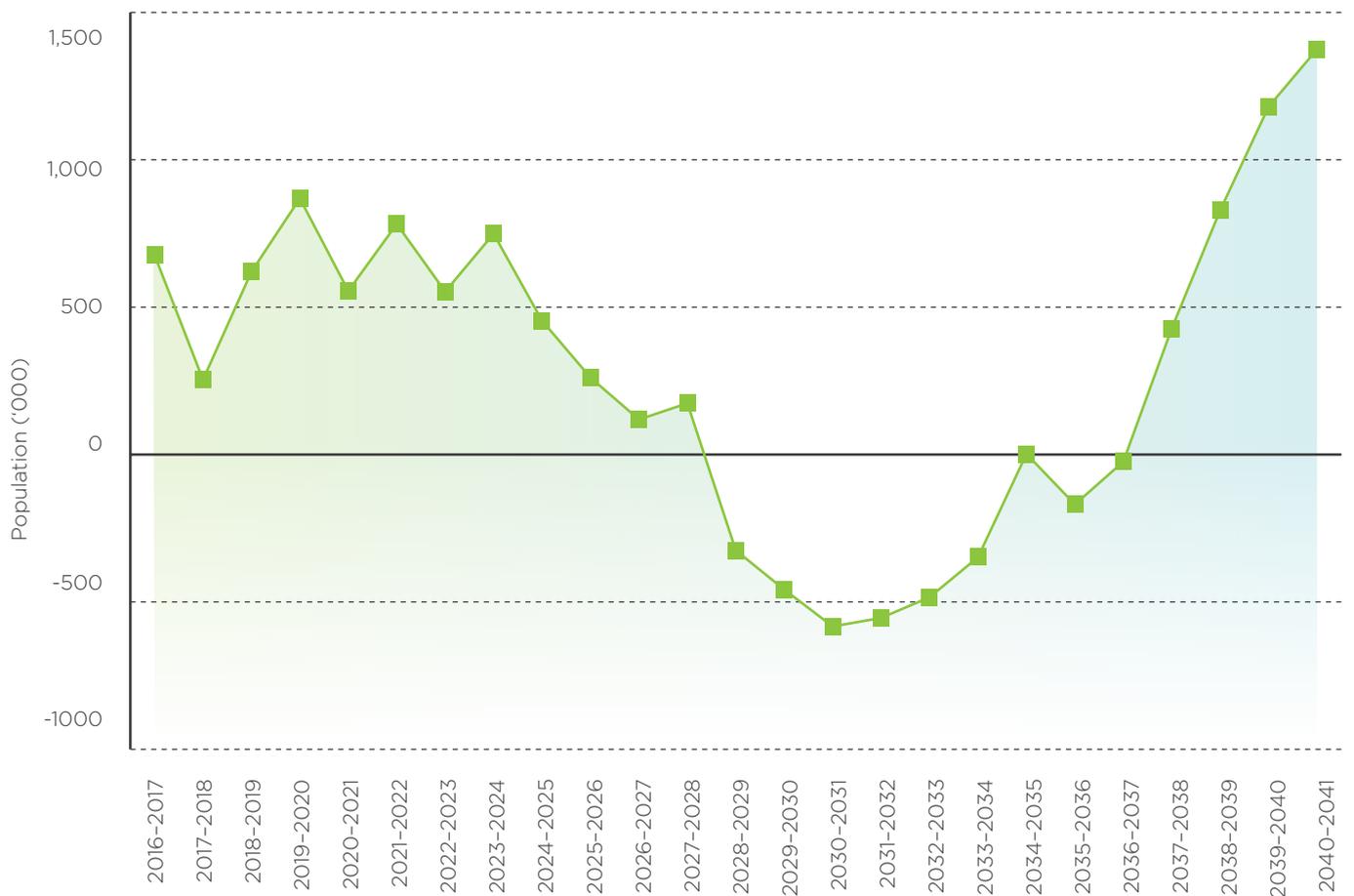
Fig1.13 looks at the annual change in Gloucestershire's working age population and shows that between 2016 and 2041 Gloucestershire's working age population is projected to increase overall.

However, between 2023 and 2031 the county is projected to see a declining working age population. Projections looking beyond 2031 suggests at this point Gloucestershire's working age population will return to a period of overall growth.

Fig 1.14 Net change in the 16–64-year-old population, 2016–41

Chart with y-axis "Number of people" ranging from -3000 to 7000. Districts: Cheltenham (approx -1150), Cotswold (approx -2150), Forest of Dean (approx -1500), Gloucester (approx 6000), Stroud (approx -1650), Tewkesbury (approx 3650).
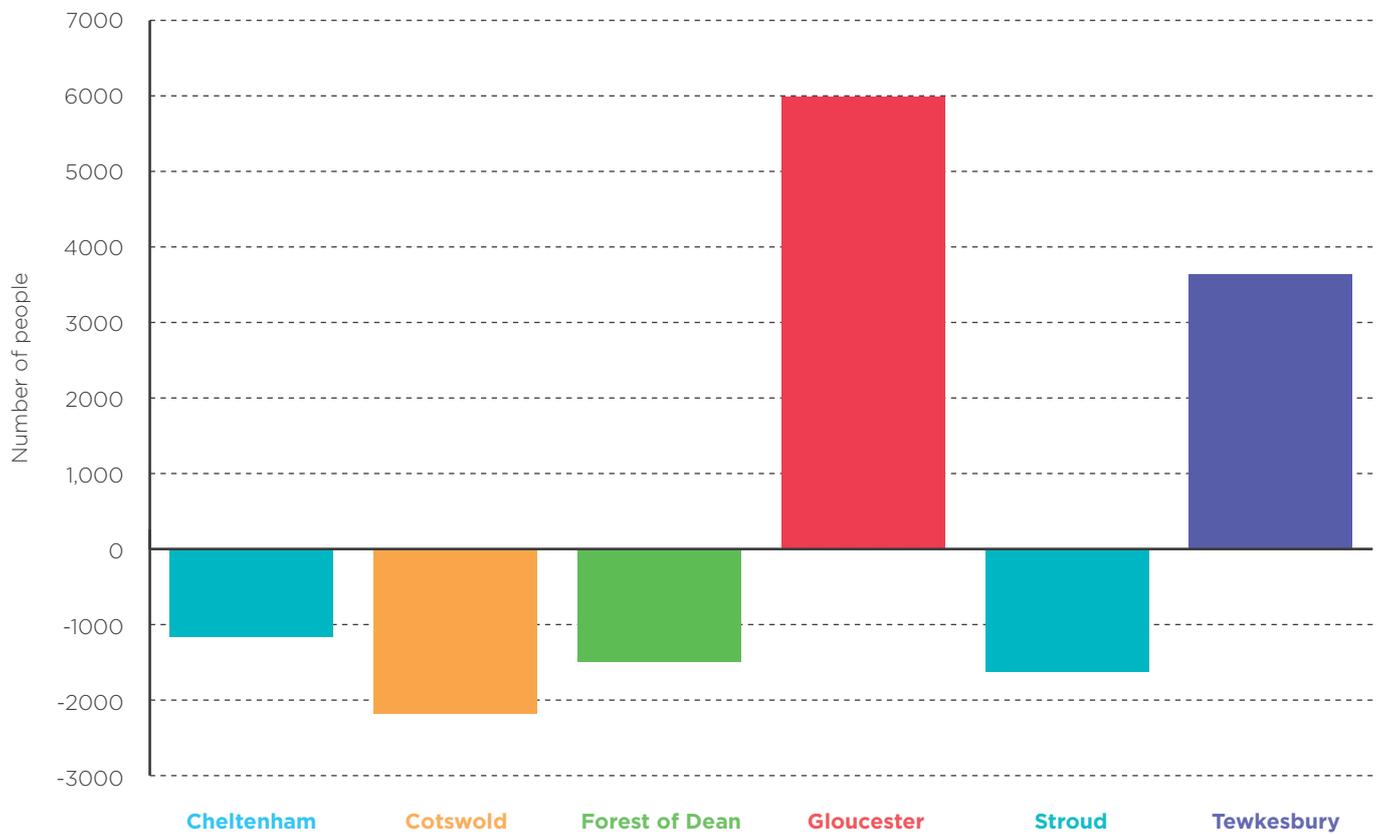
Fig1.14 shows there will be considerable variation across the districts, with Gloucester and Tewkesbury expected to see growth in their working age population while the other four districts are expected to see a decline in the number of 16–64-year-olds.

This picture suggests employers may face challenges in the future in terms of recruitment, however it is worth noting that this data only looks at the 16–64-year-old population and does not take into account the increasing retirement age which means an increasing number of people will stay in the workforce beyond the age of 64.

Ethnicity in Gloucestershire

Ethnicity data from the Annual Population Survey reveals Gloucestershire has a predominantly White population, although there are differences between the urban and rural areas.

Fig 1.15 Proportion of White population by district, 2011

District	White %
Cheltenham	94%
Cotswolds	98%
Forest of Dean	98%
Gloucester	89%
Stroud	98%
Tewkesbury	98%

Fig1.15 shows that the areas with the highest proportions of ethnic minorities are the two urban districts. This is not particularly notable and follows the trend of much of the rest of the country. However, there is a difference between the two largest urban centres in Gloucestershire, with Gloucester having an 89% White population and Cheltenham a 94% White population. Comparatively, the rural districts each have around a 98% White population, with the Forest of Dean just being highest. This highlights the rural/urban divide in the county, although demonstrates that, like much of the rest of the country, Gloucestershire is not a particularly ethnically diverse area.

Fig 1.16 UK National population by LEP, 2018

Area	UK born %
Gloucestershire	93%
Oxfordshire	90%
Swindon and Wiltshire	92%
West of England	92%
Worcestershire	95%
England	90%
South West	94%

Fig1.16 looks at the proportion of residents born outside the UK in Gloucestershire and LEP comparator areas. The data shows Gloucestershire does not attract a high number of international migrants with 93% of the population being born in the UK (with 46,108 or 7% born outside UK). This is higher than all other comparator areas with the exception of Worcestershire and is higher than the England rate of 90%. However, in comparison to the South West region, Gloucestershire has a slightly lower proportion of UK born residents, with the South West population being 94%.

Fig 1.17 Non-British country of birth by district, 2011

- Ireland
- Other Europe
- Middle East and Asia
- The Americas and the Caribbean
- Africa
- Antarctica and Oceania
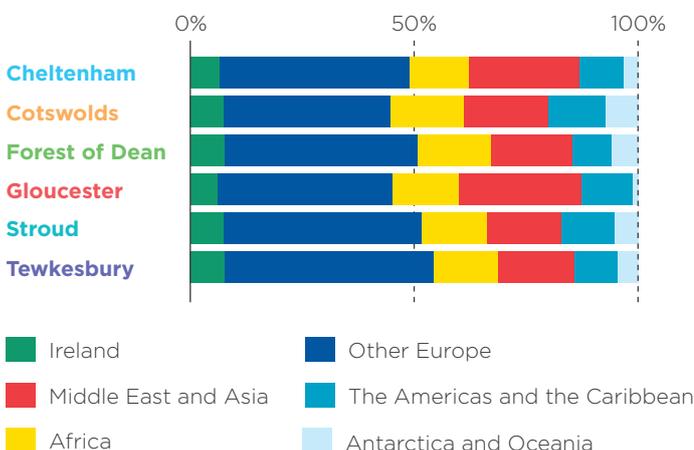
Fig1.17 looks at the country of birth for Non-British residents of Gloucestershire. The 2011 Census reveals that in all districts, around half of all immigration from outside the UK was from Ireland and the rest of Europe. Looking beyond this, a significant proportion, particularly in Cheltenham and Gloucester, of people immigrated from the Middle East and Asia, around a quarter of the total in both cases. In contrast, the more rural districts seem to have higher immigration from the Americas and the Caribbean. Finally, the proportion of people moving from Africa to each of the districts is roughly consistent, with each at around 15% of the total. There is also a limited amount of immigration from Oceania, with this fairly evenly spread across the more rural districts.

Economic Activity in Gloucestershire 2010 to 2018

The total number of people employed in Gloucestershire has increased by 29,100 between 2010 and 2018 to reach 327,100.

Fig 1.18 Employment rates of those aged 16–64, Gloucestershire and comparators, 2010–18

Fig1.18 shows that the employment rate has risen from 75.4% to 82% in the period, sitting above neighbouring LEP areas (78–79%), the South West region (78.7%) and the national rate (75.4%). At 71.3% the proportion of employed people working full-time is slightly below the South West region proportion of 71.8%, but well below the national proportion of 75.1%.

Fig 1.19 Employment and self employment, 2018

Fig1.19 shows that, compared to national, regional and comparator LEP areas, Gloucestershire has the highest employment rate (81.9%). The proportion of 16–64-year-olds that are employees is higher than regionally or nationally at 68.2%. Three comparator LEP areas (Oxfordshire, Swindon and Wiltshire and West of England) have a higher share of employees, but when accounting for self-employment (which is relatively high in Gloucestershire) these three LEP areas have a lower share of total employment activity.

Employment rate (%)

Area	Self Employed	Employee
Gloucestershire	13.7%	68.2%
Oxfordshire	10.8%	70.2%
Swindon and Wiltshire	10.0%	69.4%
West of England	10.0%	68.9%
Worcestershire	11.6%	67.5%
England	10.9%	64.2%
South West	12.3%	66.1%

■ **Self Employed**
■ **Employee**
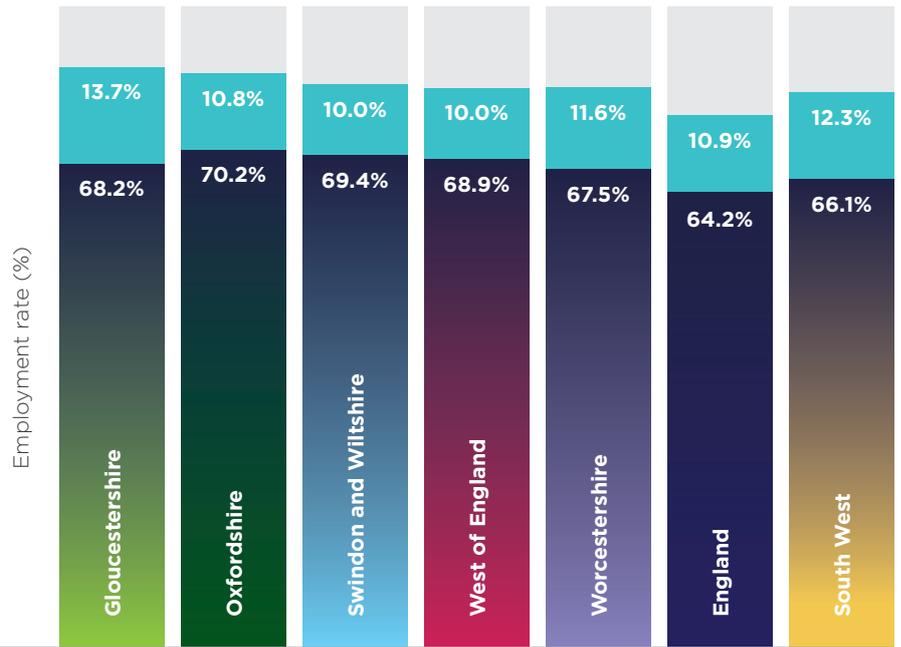
Fig 1.20 Unemployment rates of those aged 16–64, 2018

Fig1.20 illustrates for the point above, showing that Gloucestershire at 2.1% has a considerably lower level of unemployment than comparator LEP areas and the South West region. It stands at half the national rate of 4.2%.

Area	Unemployment
Gloucestershire	2.1%
Oxfordshire	2.2%
Swindon and Wiltshire	3.5%
West of England	3.4%
Worcestershire	3.3%
England	4.2%
South West	3.2%
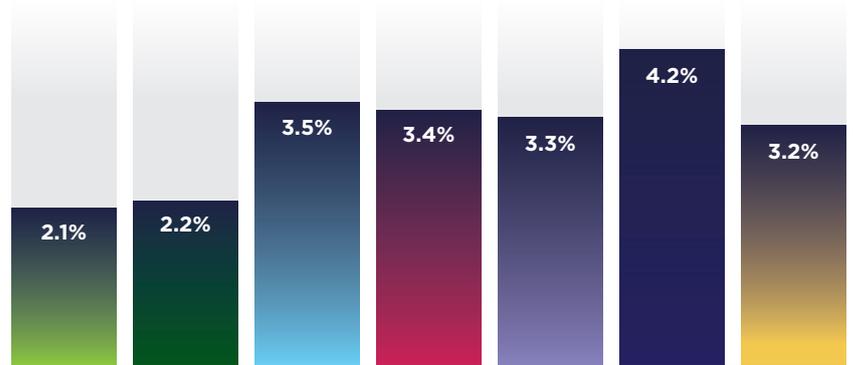
■ **Unemployment**

Fig 1.21 Numbers of 50–64-year-old Gloucestershire workers in full-time and part-time employment, 2010–18

Fig1.21 highlights that over the period 2010–2018 there have been growing numbers of 50–64-year-old workers who are in the labour market as either full-time employees (+9,200) or part-time employees (+14,200). The economic activity rate is around 5% higher for this group than nationally; however, the proportion of 50–64-year-old workers in full-time employment is nearly 8% lower than nationally (not shown in the graph).

People

Full-time 50–64 years: 61,000 (2010) → 70,020 (2018)
Part-time 50–64 years: 34,500 (2010) → 48,700 (2018)

■ Full-time 50–64 years ■ Part-time 50–64 years
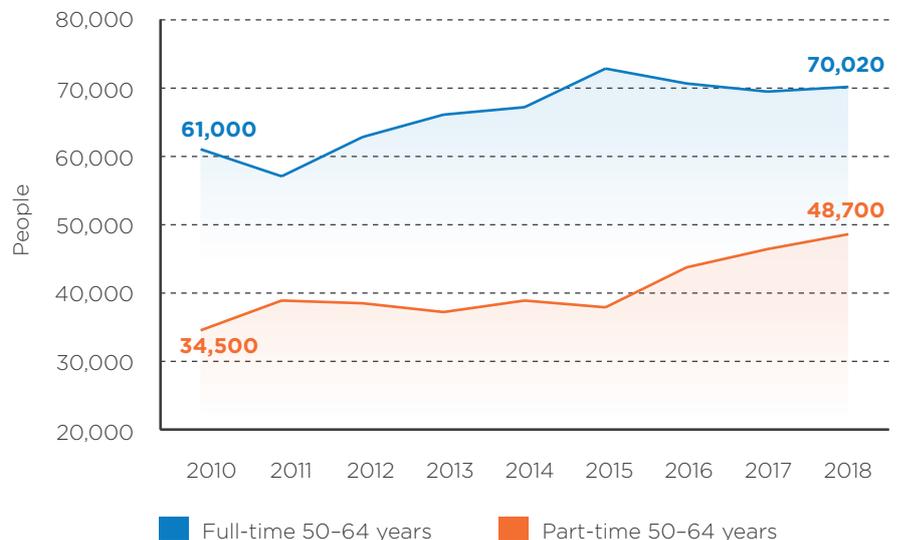
Economically Inactive Population of Gloucestershire

In 2018 the total economically inactive population in Gloucestershire stood at 61,400 people, or 16.2% of the working age (16–64) population.

Fig 1.22 Gloucestershire comparative economic inactivity rate, 2010–18

Legend: England · South West · Gloucestershire
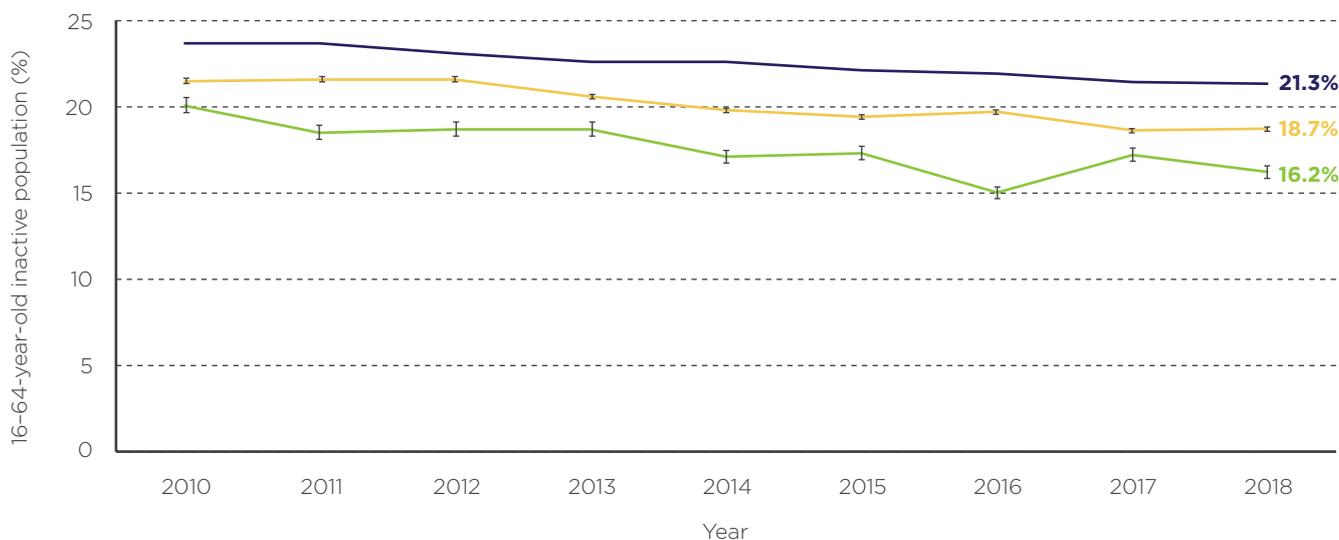
Fig1.22 shows that economic inactivity has declined since 2010, when it stood at 74,800 people or 20.1%. In 2010 the rate stood at 3.6% below the national rate and by 2018 this gap had widened to 4.1% below the national rate of inactivity[6].

Stroud started and ended the period with the lowest inactivity rate of the six districts and Cotswold started and ended with the highest (not shown in the graph).

6   For help interpreting error bars please see Appendix 2

Fig 1.23 Economic inactivity rates by age, including for men and women, Gloucestershire, 2018

Legend: All people · Men · Women
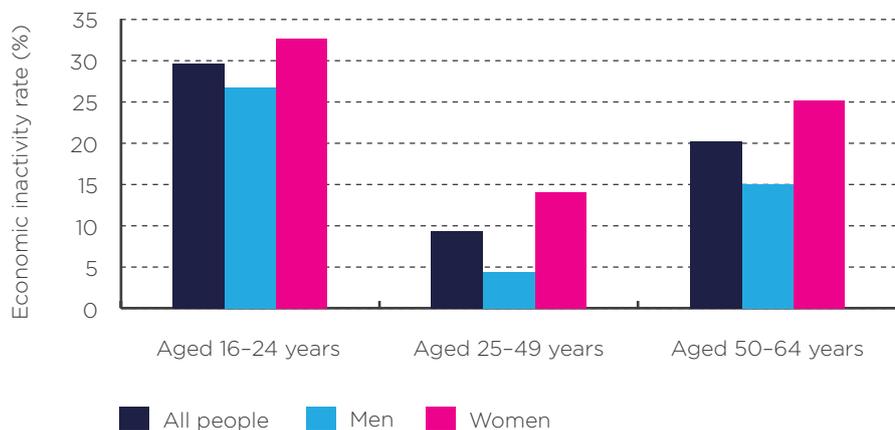
Fig1.23 shows how rates of inactivity are split by age and gender. The rate of inactivity is highest amongst the 16–24 age group, and this is broadly explained by high numbers of students in this group. For those aged 25–49 the rate of inactivity for women is over three times higher than for men. For those aged 50–64 around half of the difference between men and women is explained by differences in retirement age.

Skills and Occupations of the Economically Active in 2018

Between 2010 and 2018 the number of people with NVQ4+ higher level skills in the Gloucestershire labour market increased by 10,200 people to reach 134,400, which is 42% of the economically active population. This is above the South West (41.9%) but below England (43.5%).

Fig 1.24 **Skills of the economically active in Gloucestershire, 2018**

Other
18,400
6%

No Qualifications
12,700
4%

NVQ1 Only
35,500
11%

NVQ2 Only
47,500
15%

Trades
9,700
3%

NVQ3 Only
58,600
19%

NVQ4+
134,400
42%

Fig1.24 shows the numbers and proportions of people who are economically active with different skill levels.
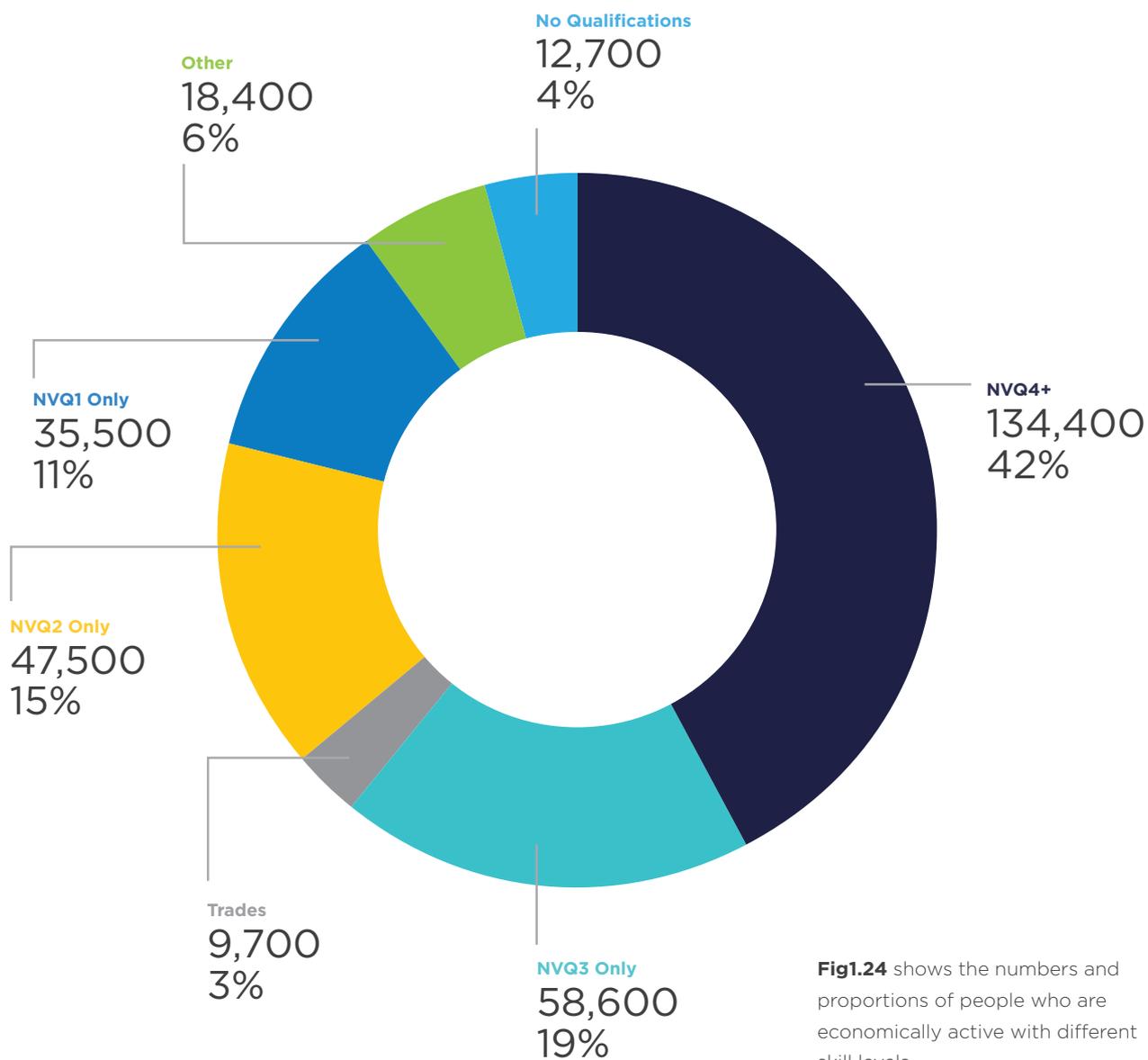
Fig 1.25 Change in share: skills of those economically active in Gloucestershire and comparators, 2010–18
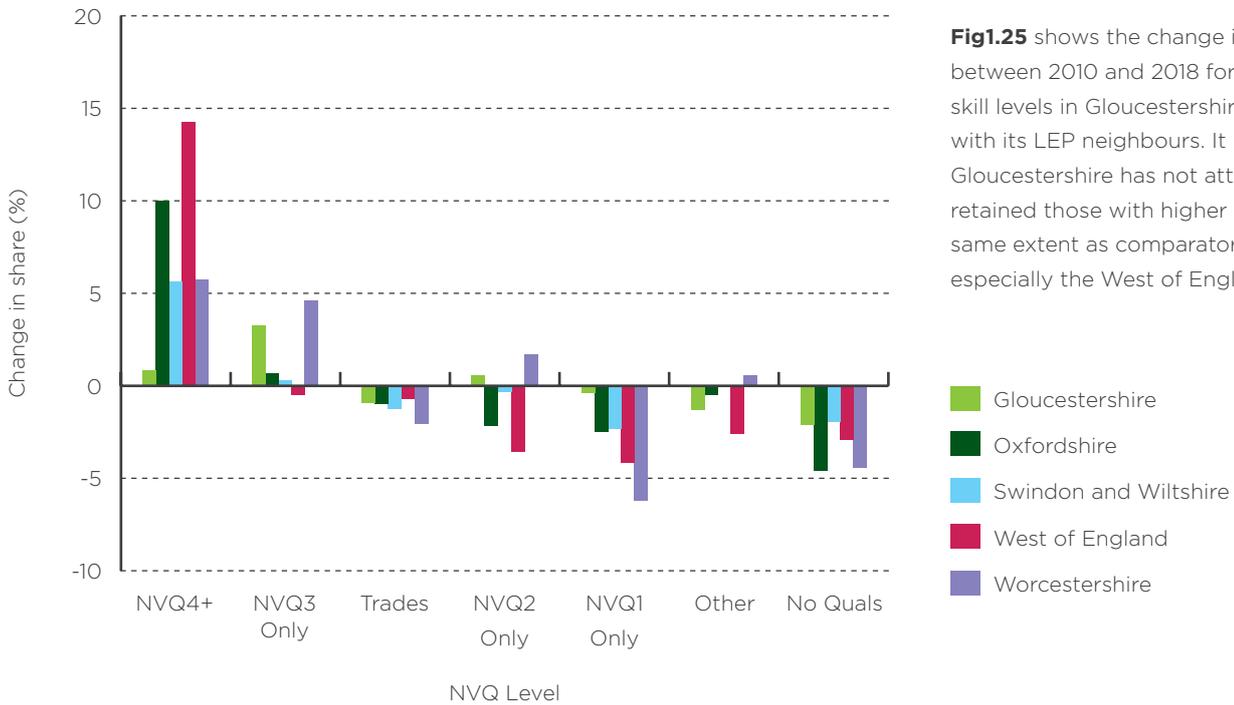
Fig1.25 shows the change in share between 2010 and 2018 for different skill levels in Gloucestershire compared with its LEP neighbours. It is clear that Gloucestershire has not attracted and retained those with higher skills to the same extent as comparator LEP areas, especially the West of England.

- Gloucestershire
- Oxfordshire
- Swindon and Wiltshire
- West of England
- Worcestershire

Fig 1.26 Occupational groups, 2018

- Managers, directors and senior officials
- Professional occupations
- Associate professional and technical
- Administrative and secretarial
- Skilled trades occupations
- Caring, leisure and other service occupations
- Sales and customer service occupations
- Process, plant and machine operatives
- Elementary occupations
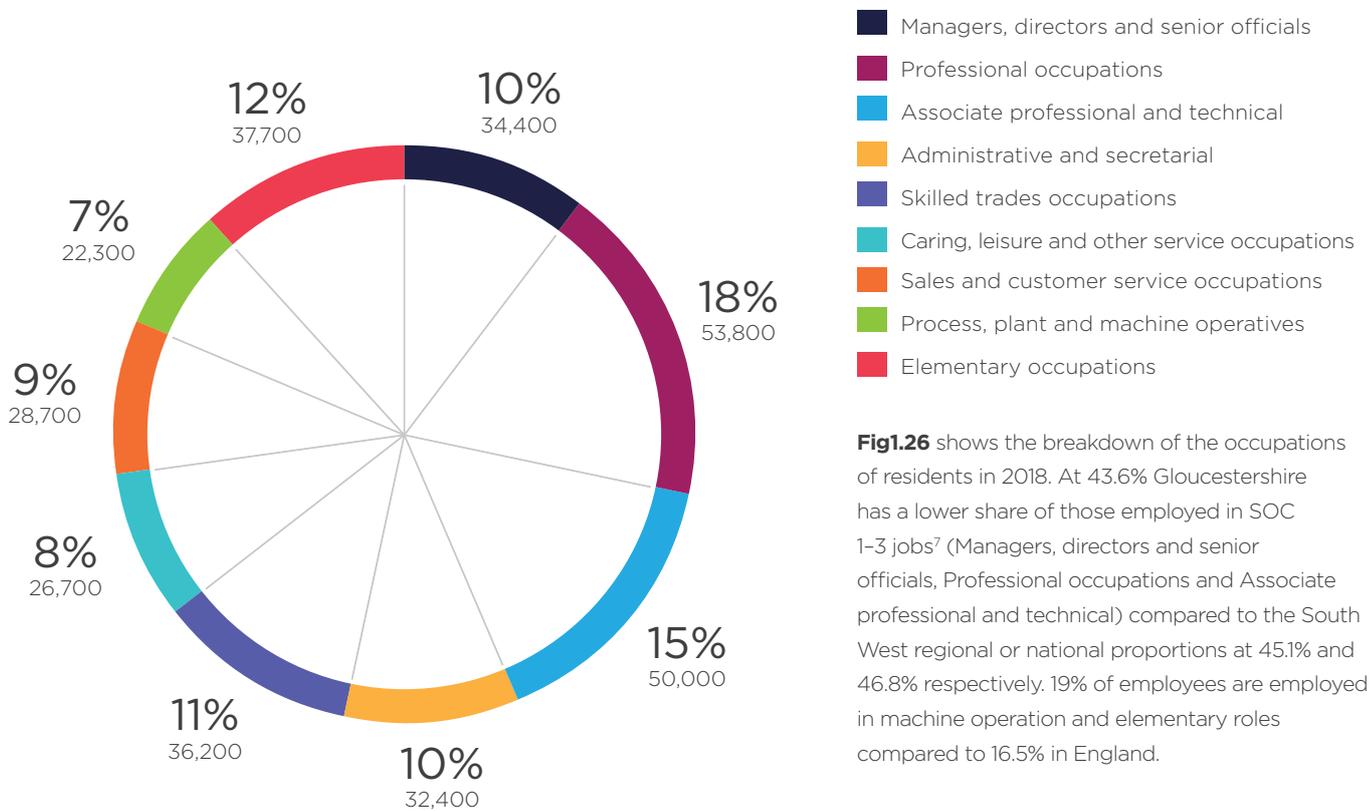
Fig1.26 shows the breakdown of the occupations of residents in 2018. At 43.6% Gloucestershire has a lower share of those employed in SOC 1–3 jobs[7] (Managers, directors and senior officials, Professional occupations and Associate professional and technical) compared to the South West regional or national proportions at 45.1% and 46.8% respectively. 19% of employees are employed in machine operation and elementary roles compared to 16.5% in England.

7   Standard Occupational Classifications (SOC) 2010

Skills and Occupation Changes 2010 to 2018

This page shows the change in the number of employed people by occupational group since 2010.

Fig1.27 shows that between 2010 and 2018 only Associate professional roles within SOC1–3[8] grew (+7,700), with large shifts towards employment in Sales and customer service (+13,700) for men and women, and large growth in Elementary roles (+9,700), especially for women (+8,300).

8   Standard Occupational Classifications (SOC) 2010

Fig 1.27 **Change in the number employed by occupational group, Gloucestershire, 2010–18**
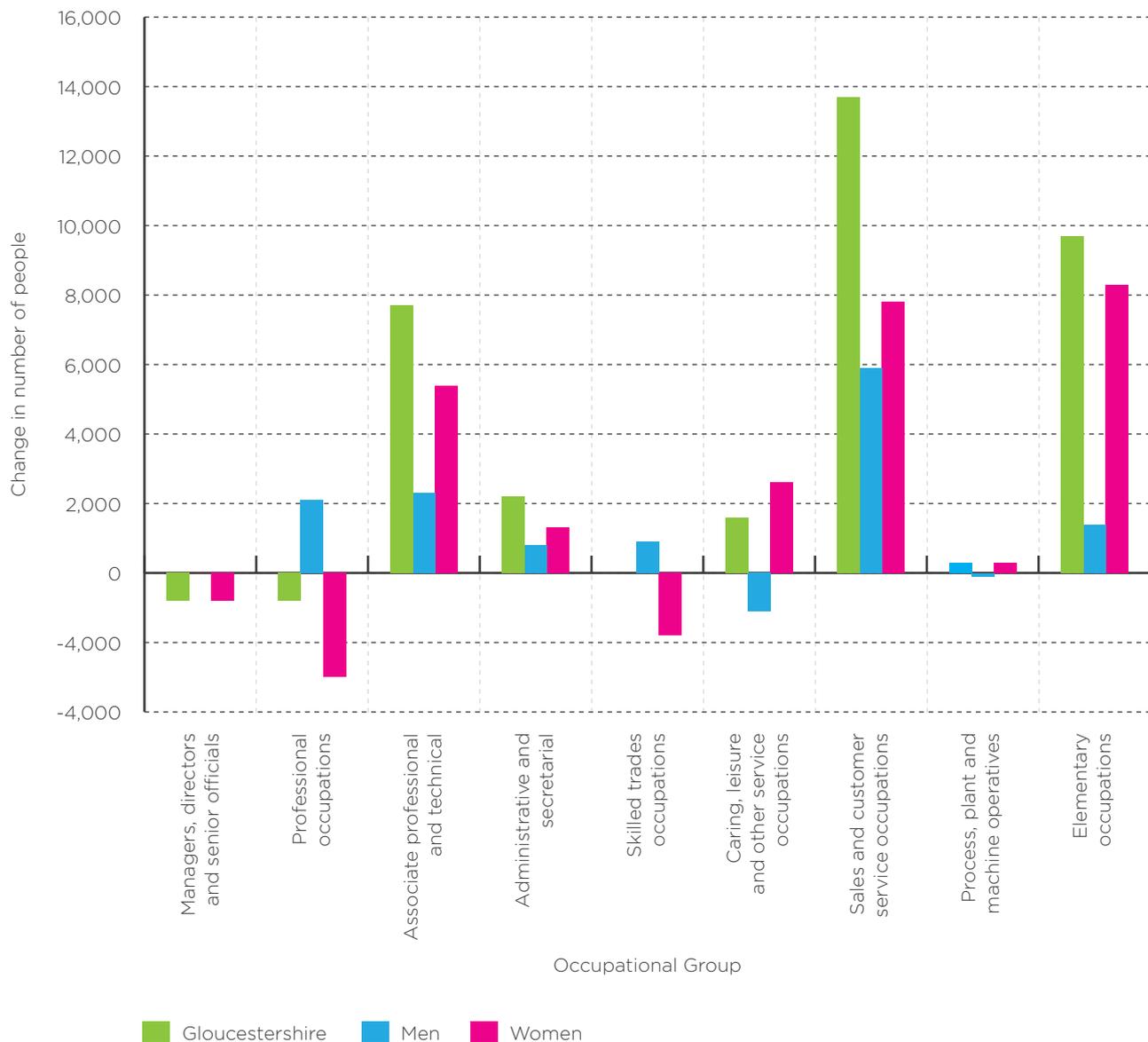
Projected Employment Trends to 2036

Fig 1.28 Projected trend in total employment, 2106–36
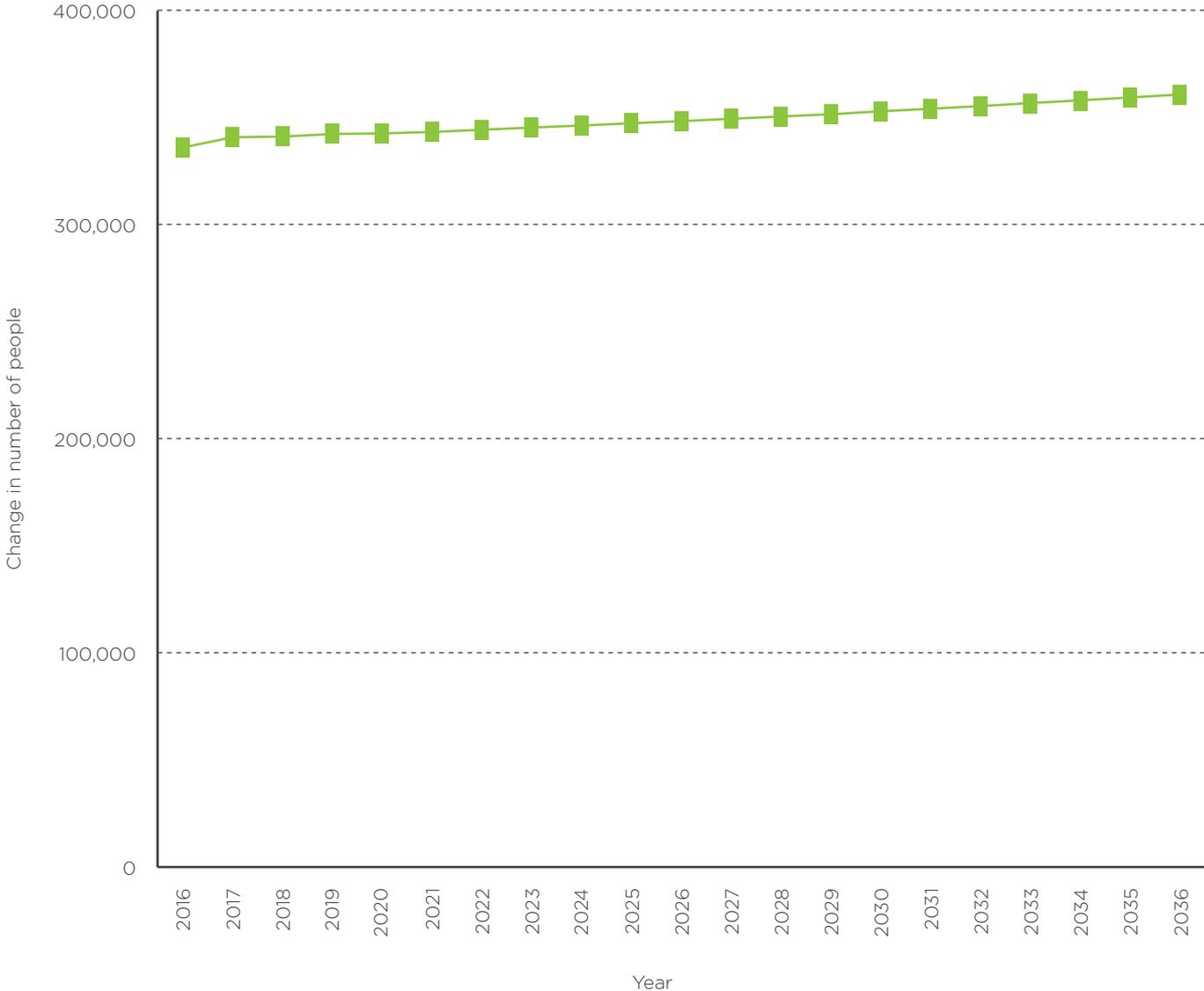
Fig1.28 shows that, according to the Local Economic Forecasting Model (LEFM), Gloucestershire's employed population (employee and self-employed) is set to increase by around 24,000 between 2016 and 2036, to 360,600 people. This trend, however, shows that growth is expected to be at a more conservative rate than it has been recently, with a projected average annual change of 0.35% in line with the regional and national average.

Fig 1.29 Projected change in employment by broad sector, 2016–35

Sector	CAGR
Agriculture, forestry & fishing	1.5%
Health	1.4%
Information & communication	0.8%
Accommodation & food services	0.7%
Construction	0.6%
Mining, quarrying and utilities	0.5%
Business administration & support services	0.5%
Professional, scientific & technical	0.5%
Motor trades	0.3%
Education	0.2%
Retail	0.2%
Arts, entertainment and recreation	0%
Finance & insurance	-0.2%
Property	-0.3%
Public administration & defence	-0.4%
Wholesale	-0.4%
Transport & storage (inc postal)	-0.5%
Manufacturing	-0.6%

■ UK ■ Gloucestershire

Compound annual growth rate (2016–35)

Fig1.29 shows that four sectors, namely Agriculture, forestry & fishing; Health; Information & communication; and Accommodation & food services are anticipated to see the greatest growth over the next 20 years for Gloucestershire compared to the UK average. These sectors along with Construction; Mining, quarrying and utilities; Motor trades; and Education are all expected to grow above the national rate. The Wholesale sector is expected to exceed the national decline, while the Manufacturing sector is also expected to decline,

but at a slower rate than the national average. The Finance & insurance; Property; Public administration & defence; and Transport & storage sectors are also expected to decline in contrast to the national picture.

In absolute numbers the greatest increase in employment in Gloucestershire is expected to be in Health and Accommodation & food services. Conversely the greatest fall is projected to be in Manufacturing, followed by Public administration & defence.

Economic projections generated by the LEFM provide an indication of future economic growth and predict potential changes in employment. These projections are presented as a guide and do not consider the impact of current policies and initiatives. They will also differ from projections generated by other models. The LEFM has been developed to forecast economic activity in local areas in a way that is consistent with regional and national forecasts. Although the model includes several econometric relationships, lack of data currently precludes the estimation of a complete model in the conventional sense. Many of the relationships are therefore imposed by assumption, based on the broader regional or national models estimated by Cambridge Econometrics and the Institute for Economic Research (University of Warwick). LEFM should therefore be regarded primarily as a simulation model rather than an accurate econometric representation of a local economy.

School Forecasts for Gloucestershire

Schools in Gloucestershire are expected to see growth in student numbers over the next few years, at least up to 2025/26. Over the period, existing schools are expected to see a rise of 8% in the number of 11–16-year-old students, from 33,446 students to 36,106. There is expected to be a rise of 20.3% in the number of 'Sixth Form' students (16+) from 6,234 students to 7,500. These increases do not take account of any planned (or unplanned) housing.

Fig 1.30 Forecast of students aged 11–16 by School Planning Area
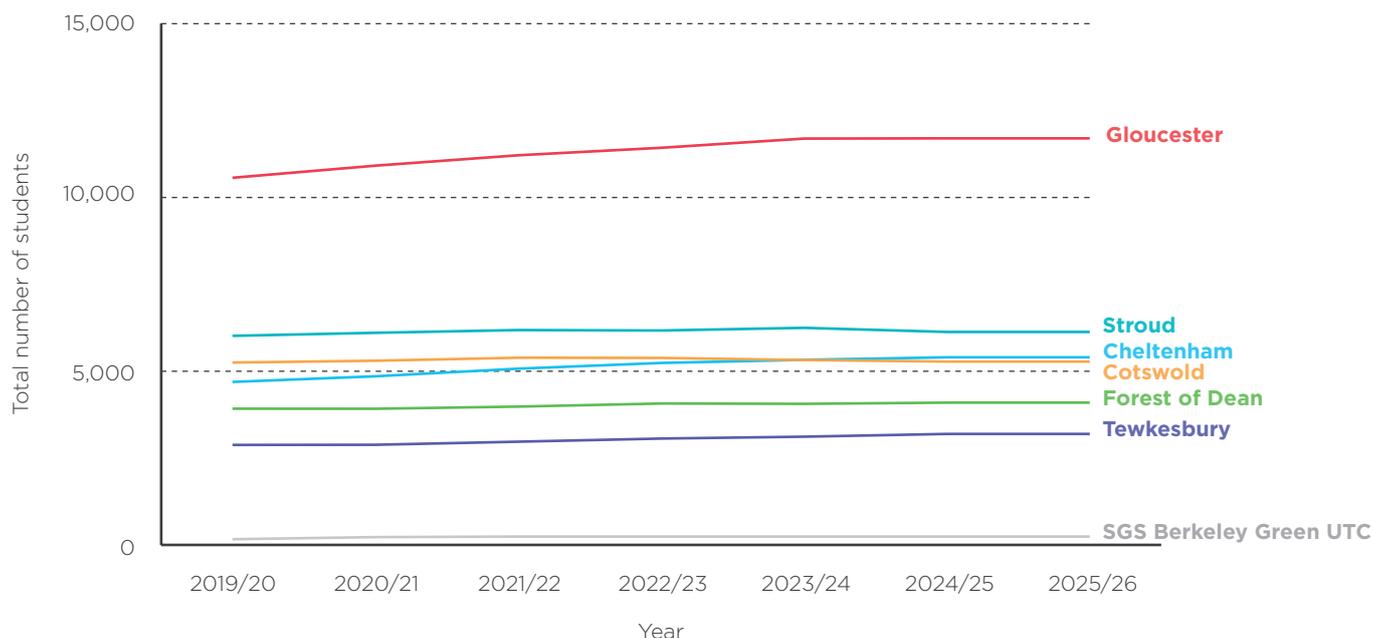
Planning Area	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	% Change 2019/20 to 2025/26
Forest of Dean	3916	3914	3983	4082	4071	4110	4110	5%
Tewkesbury	2875	2879	2973	3069	3126	3210	3210	12%
Cotswold	5242	5302	5401	5394	5325	5274	5274	1%
Stroud	6010	6105	6191	6177	6260	6132	6132	2%
Cheltenham	4685	4852	5077	5246	5338	5413	5413	16%
Gloucester	10554	10908	11212	11431	11700	11707	11707	11%
SGS Berkeley Green UTC	164	240	260	260	260	260	260	59%
Total	**33446**	**34200**	**35097**	**35659**	**36080**	**36106**	**36106**	**8%**

Fig1.30 shows a forecast of student numbers by School Planning Area to the year 2025/26 for the ages of 11–16. While the total is expected to increase substantially, this is spread differently across the School Planning Areas. There is expected to be a fairly static number of students for the Cotswold Planning Area, only increasing over the period by around 30 students, while Gloucester Planning Area is expected to see an increase of 10.9%, from 10,554 students to 11,707 students. It should be noted that the Gloucester Planning Area contains the suburbs of Churchdown and Brockworth in addition to Gloucester City. The Cheltenham School Planning Area is also expected to see an increase in student numbers of around 16%.

Fig 1.31 Forecast of Sixth Form students by School Planning Area
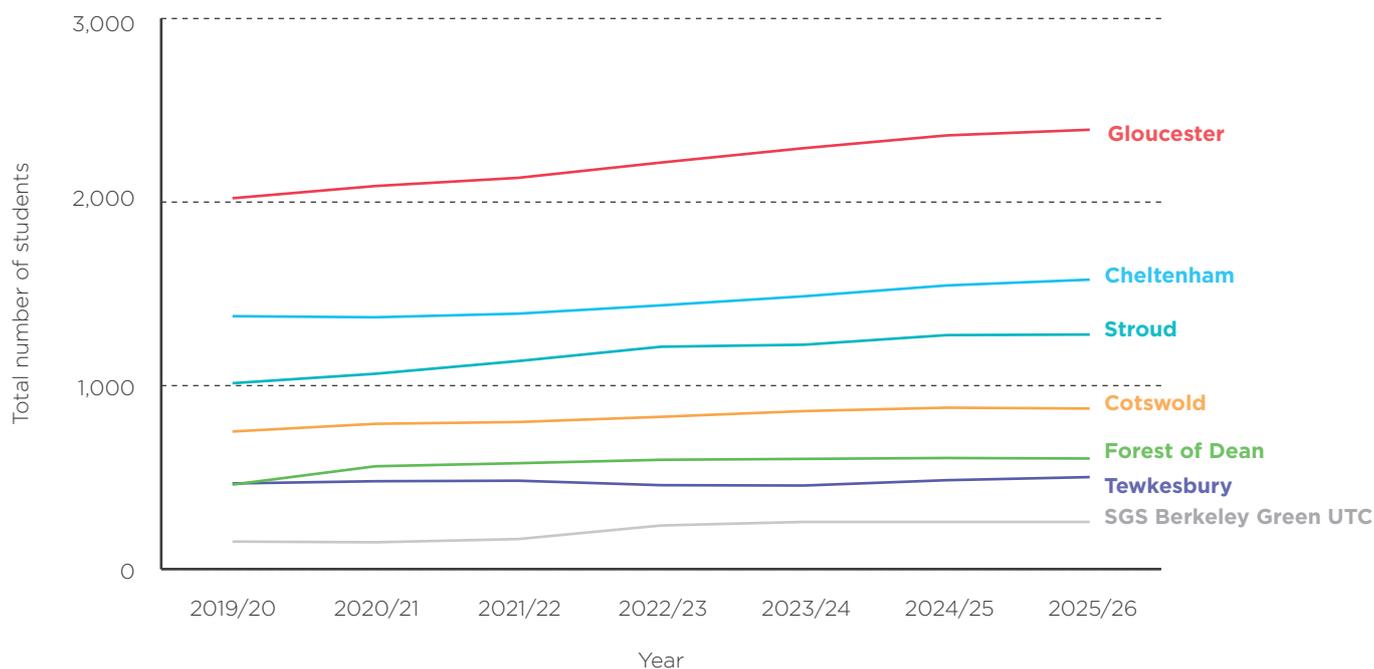
Planning Area	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	% Change 2019/20 to 2025/26
Forest of Dean	460	562	579	598	603	608	605	32%
Tewkesbury	467	480	483	457	455	486	504	8%
Cotswold	749	792	802	831	863	882	877	17%
Stroud	1012	1064	1134	1213	1224	1277	1280	26%
Cheltenham	1377	1371	1391	1437	1487	1547	1579	15%
Gloucester	2019	2086	2131	2215	2294	2364	2395	19%
SGS Berkeley Green UTC	150	146	164	240	260	260	260	73%
Total	**6234**	**6501**	**6684**	**6991**	**7186**	**7424**	**7500**	**20%**

Fig1.31 shows the forecasts for Sixth Forms, with the most significant percentage increases predicted in the Forest of Dean, Stroud, and Gloucester. (Stroud and South Gloucestershire College (SGS) Berkeley Green is a relatively new University Technical College (UTC) with numbers expected to increase at a much greater rate while it becomes established).

These figures suggest there may be pressure on Gloucestershire's current schools and the schooling system.

Key Stage 4 and Key Stage 5 Destinations and Apprenticeships

Fig1.32 shows the destinations of those who have completed their Key Stage 4 (GCSE or equivalent) qualifications. This shows that the vast majority in every district proceed to sustained further education, following the national trend. The Forest of Dean has the lowest rate of students going into full time education, at just below 80%, while Cheltenham has the highest rate, at just below 90%. Most school leavers at this stage start apprenticeships or full-time work, although nearly 10% of students in the Forest of Dean have no sustained destination.

Fig 1.32 Destination of Key Stage 4 students by districts, 2017
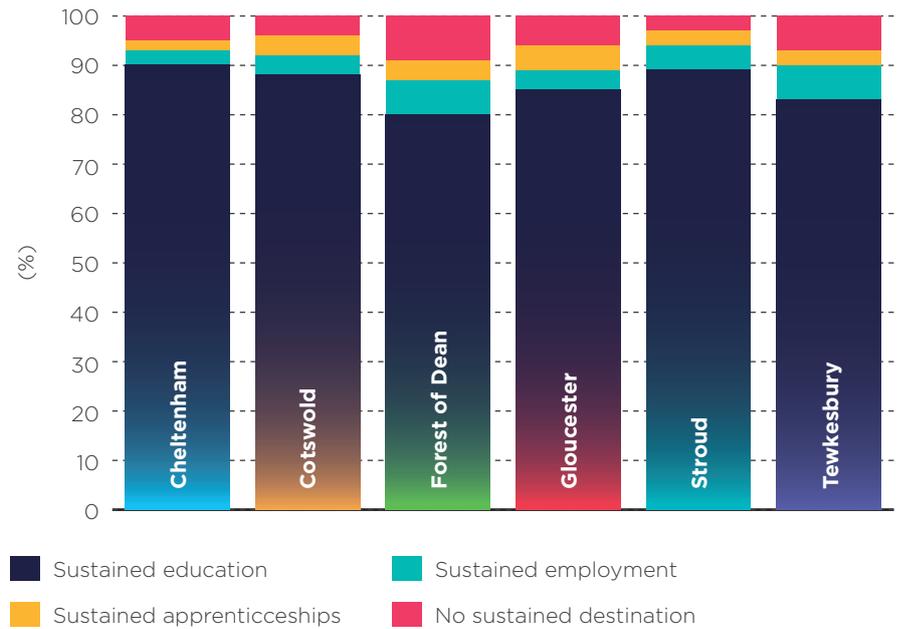
Fig1.33 shows completed Key Stage 5 (A-Level or equivalent) students. Over 50% of those who leave school after Key Stage 5 in all districts proceed to further sustained education, with most of those students going on to further education. Of those that do not go into education, a large proportion go into sustained employment, with a small number starting an apprenticeship. Again, the Forest of Dean has the greatest proportion of school leavers (around 15%) who have no sustained destination.

Fig 1.33 Destination of Key Stage 5 students by district, 2017
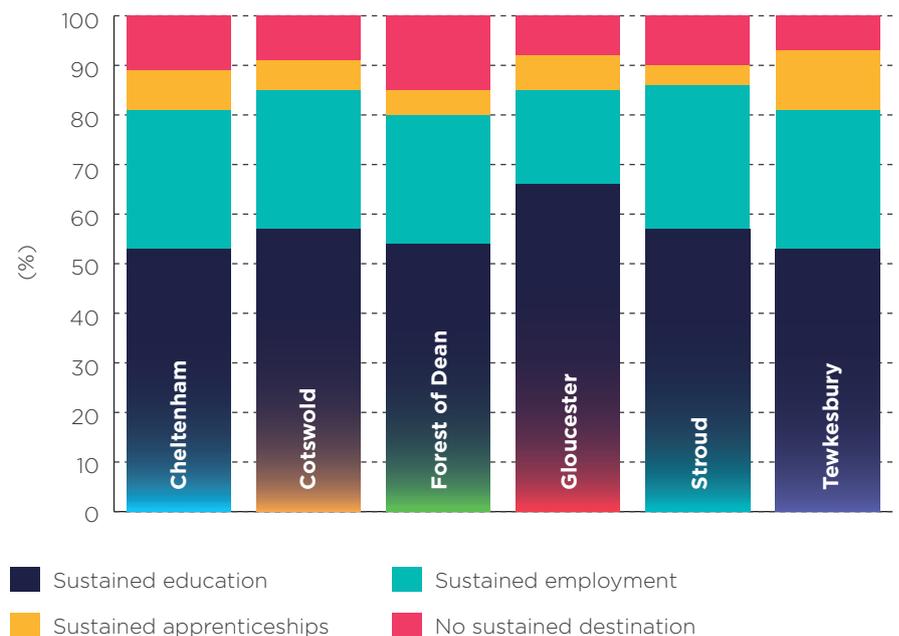
Fig 1.34 Apprenticeship starts, including higher completions
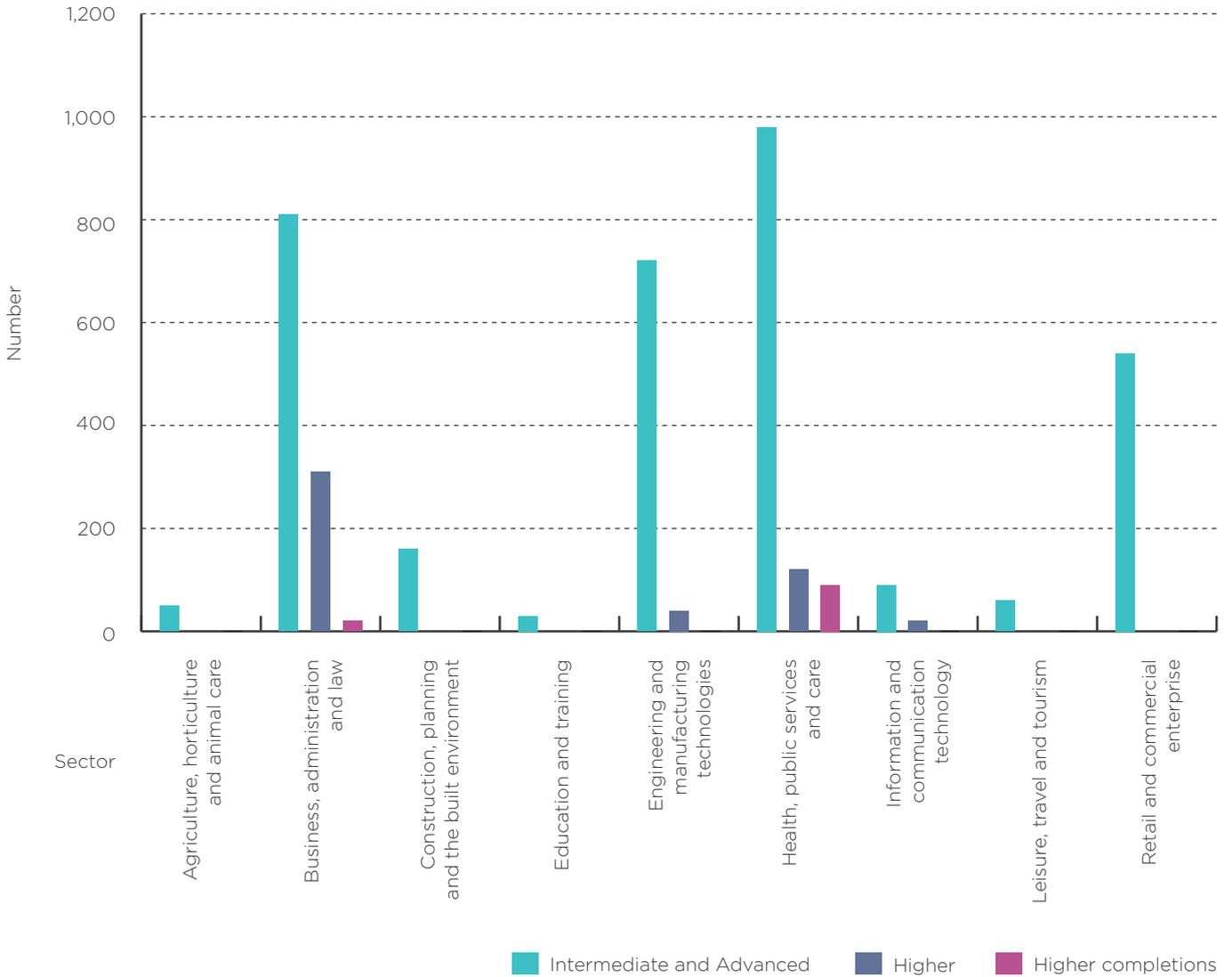
Fig1.34 shows apprenticeship starts at all levels in Gloucestershire. There has been a 79% increase in advanced and higher-level apprenticeship standards and frameworks accessible since April 2017.

In 2017/18, Gloucestershire institutions had a total of 3,920 starts and 2,770 completions. Data available for starts and completions in 2018/19 is available for the first two quarters of the year. In this period 2,270 starts have been registered (with just 670 completions due to the time of year measured), which is roughly consistent with the national average, but increasing over time.

In 2017/18:

• **490 higher apprenticeship starts were delivered, translating into 110 completions (22.4%)**

• **1,770 advanced apprenticeship starts were recorded, translating into 1,140 completions (64.4%)**

• **1,660 intermediate starts and 1,520 completions were recorded (91.6%)**

Higher apprenticeships require the completion of an advanced or equivalent framework and take multiple years to complete.

STEM Skills in Gloucestershire

Fig 1.35 Percentage of all employment in STEM occupations, 2014
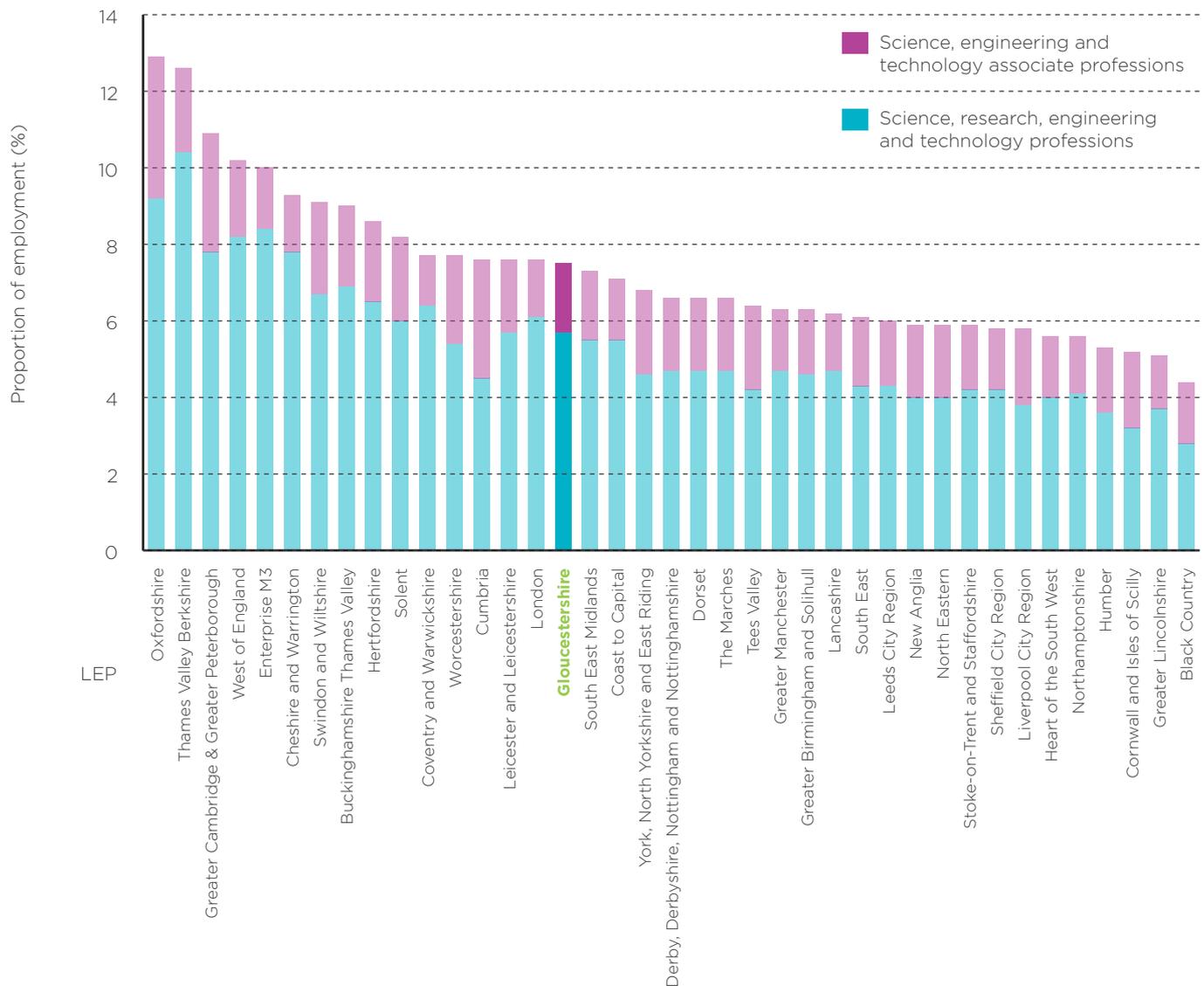
Fig1.35 shows that Gloucestershire ranks 16th of 38 LEP areas for the number of people employed in STEM roles and occupations as a percentage of the total workforce, just behind London, and behind several of its neighbours (Oxfordshire, the West of England, Swindon and Wiltshire, and Worcestershire).

7.5% of Gloucestershire employment is in STEM roles, amounting to 22,778 people. Across England 7.2% of employment is in these roles which include:

• Science, research, engineering and technology professions
• Science, engineering, and technology associate professions

As a proportion of the workforce, STEM occupations are higher than the national average. However in terms of the scale of domestic production of STEM skills within Higher Education, Gloucestershire does not produce high totals, ranking 33rd of 38 LEP areas in terms of the scale of STEM graduate skills produced.

Graduate Retention in Gloucestershire

In terms of the total level of NVQ4+ skills (equivalent to degree level) in the labour market, Gloucestershire ranks 13th out of 38 LEPs.

Fig 1.36 Proportion of first degrees with honours in STEM subjects, 2013/14
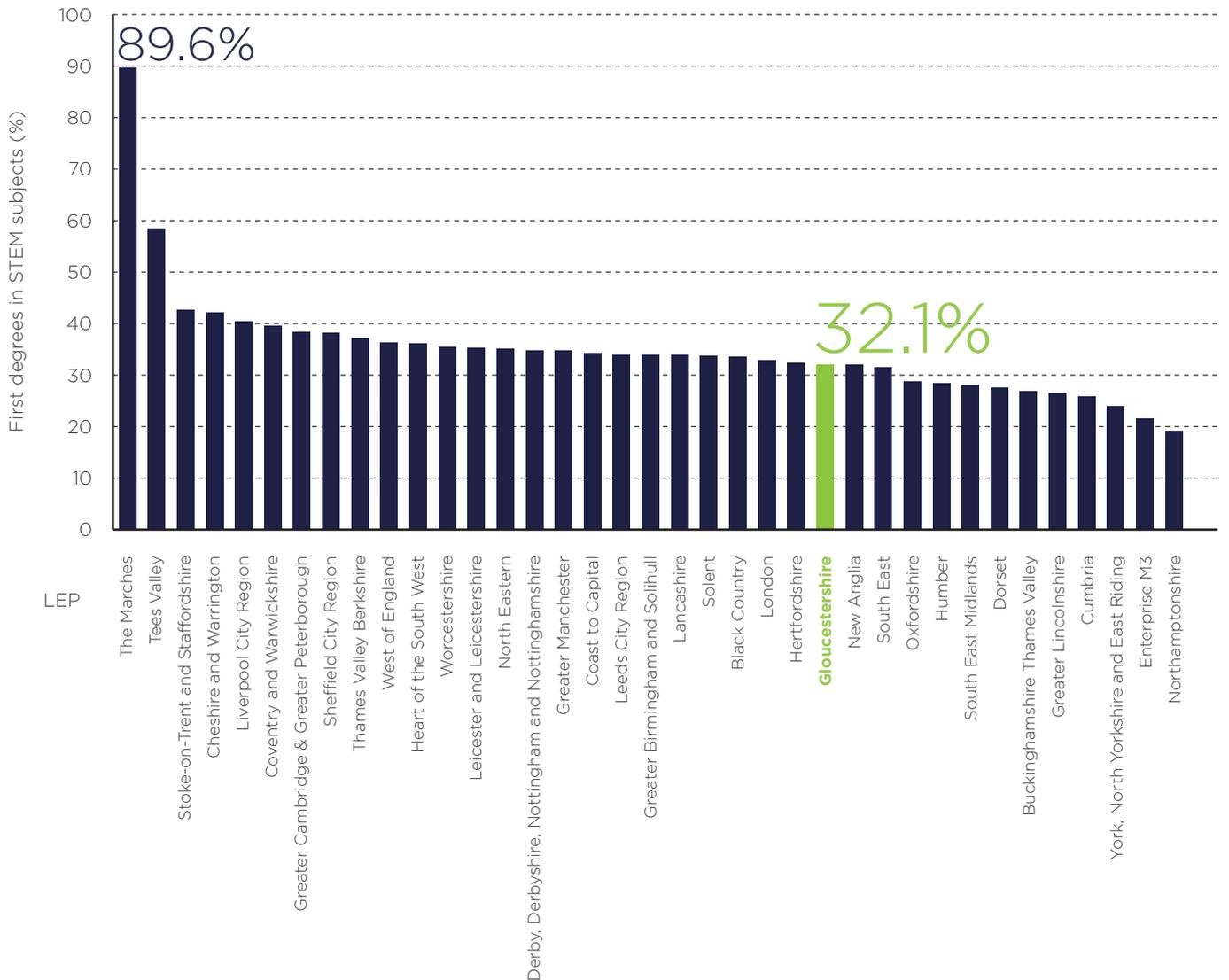
Fig1.36 shows domestic graduates with first degrees with honours in STEM subjects. A domestic graduate is a graduate of an institution within the county. For example, a graduate of Hartpury University, the Royal Agricultural University or the University of Gloucestershire would be a domestic graduate in Gloucestershire. Of 2,212 domestic first degree graduates with honours in 2014, 709 or 32.1% were STEM graduates, ranking 25th of 38 LEP areas.

Looking at doctoral qualifiers in STEM subjects, Gloucestershire produced a comparatively small total of just 13, ranking 30th. This was behind the Black Country and just 0.5% of the total 2,614 doctoral STEM graduates produced in London annually.

Fig 1.37 Retention of talent six months after graduation, 2012/13
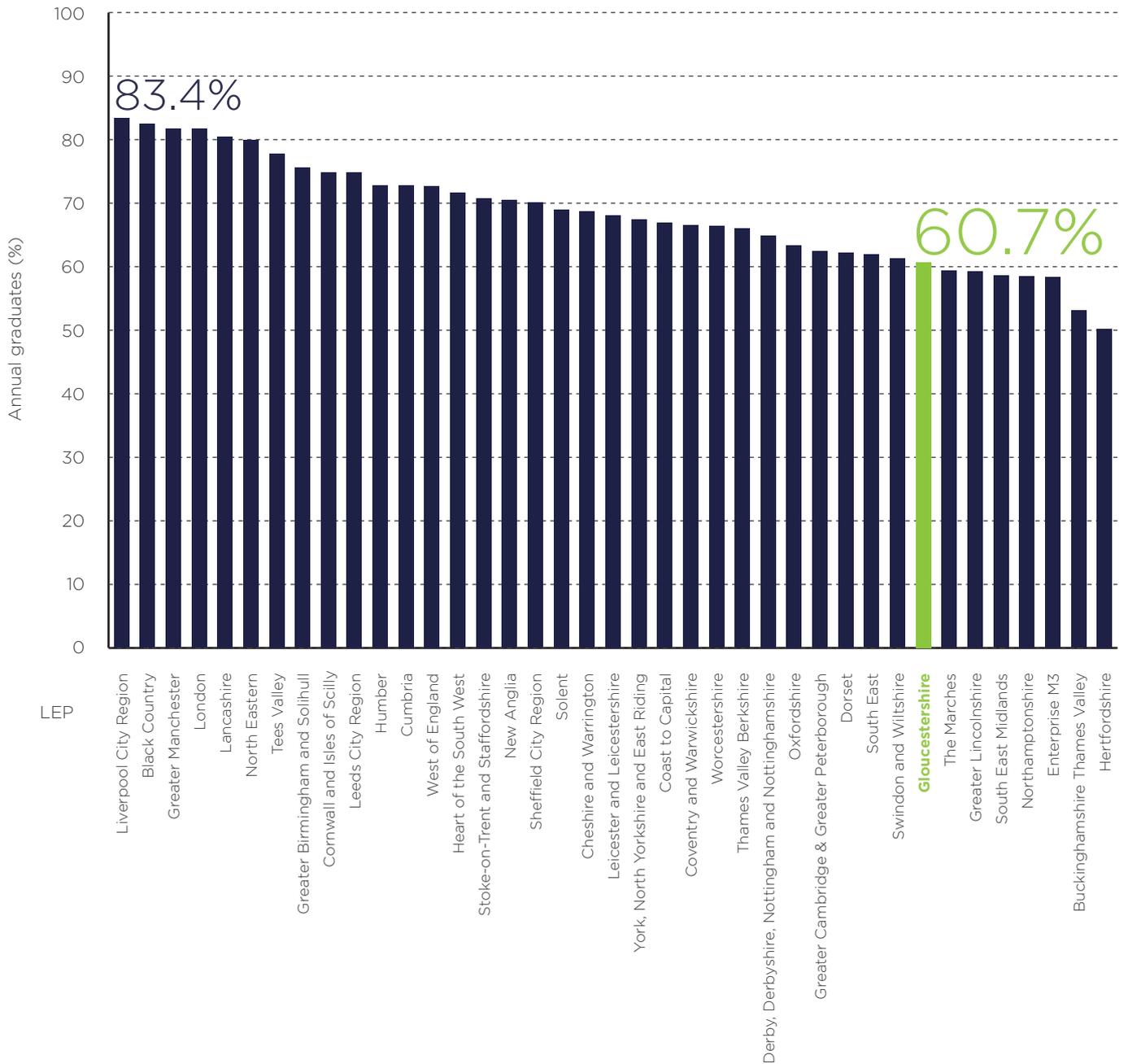
Fig1.37 shows graduate retention six months after completion, where Gloucestershire also performs less well, with a retention rate of 60.7% – 32nd of all LEPs. This shows that graduates are more likely to leave Gloucestershire within six months of graduating than they are in most other areas, including all neighbouring LEP areas. The retention rate is inherently limited to showing graduates leaving, not moving, to an area. However, it is an important factor in understanding whether graduates see Gloucestershire as a good place to live and are able to find suitable work. Retention tends to be much higher in urban areas with labour market opportunities at scale. Liverpool, the Black Country

and Manchester top these rankings above London, reflecting decisions balancing increased opportunities in these locations against higher living costs in London. It should be noted that this is a snapshot based on experimental data compiled by government in 2012/2013 and there has been a significant local focus to increase STEM retention. Data is not yet available to observe the effects of this.

Earnings in Gloucestershire

Gloucestershire had a median annual residential wage of £29,555 in 2018 (£555.90 weekly), which is lower than the England figure of £29,869 (£574.90 weekly) but higher than that of the South West £28,418 (£537.60 weekly). Gloucestershire has slightly higher median gross weekly pay for residents than workplace earnings (£555.90 against £550.70) suggesting some out-commuting to higher paying jobs.

Workplace earnings refer to the earnings recorded for the area in which the employee works, whereas *residential* earnings refer to the area in which the employee lives.

Fig 1.38 Change in median weekly earnings, 2010–18

	2010	2018
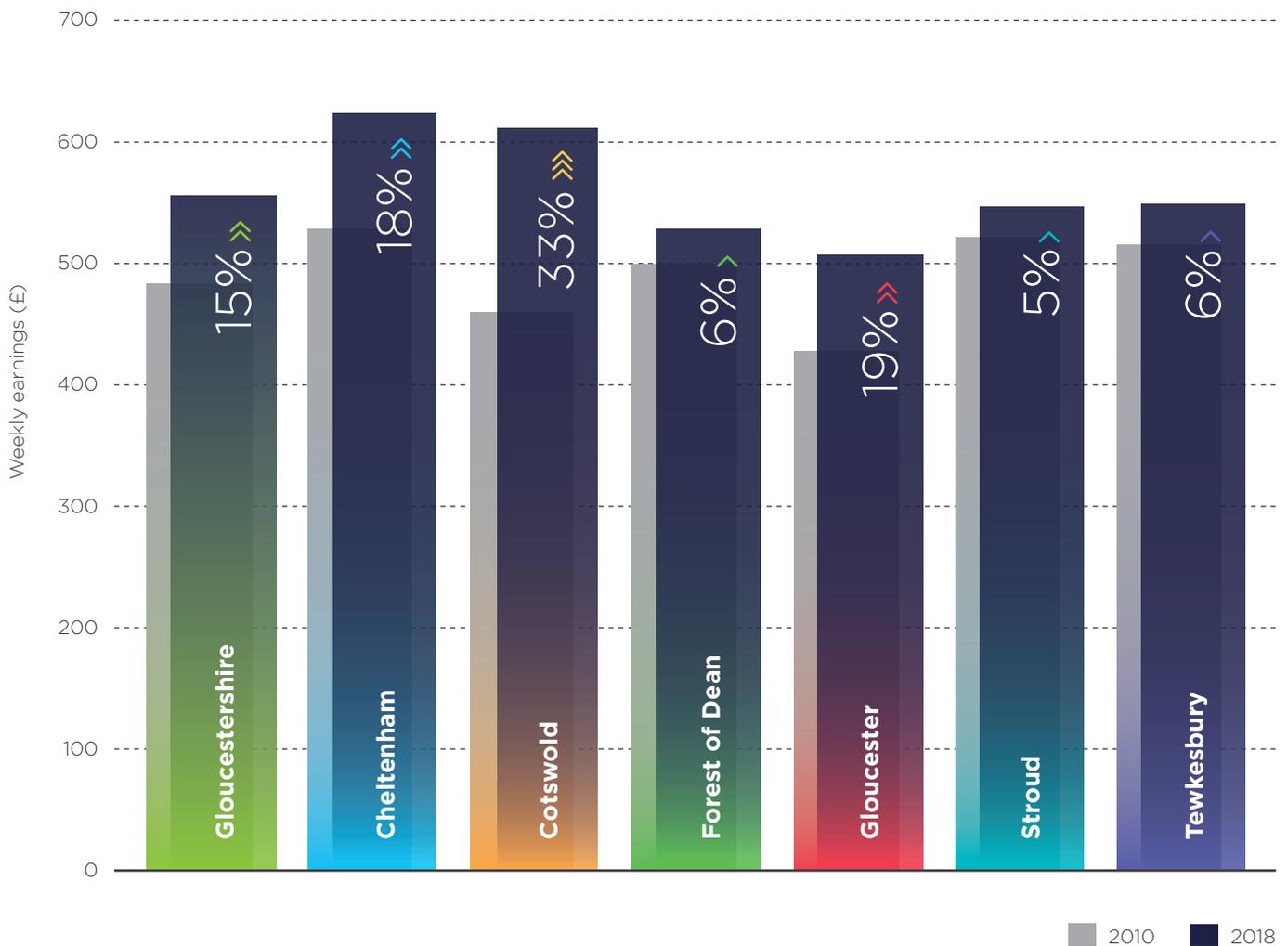
Fig1.38 shows that Cheltenham started and ended the period with the highest median weekly wages, while Gloucester had the lowest median weekly wage of the six districts over the whole period. Cotswold had the largest increase in median earnings, increasing by 33% over the period.

This derives from survey data and therefore caution should be exercised in drawing firm conclusions. In principle, many random samples could be drawn and each sample would be made up of different people who would give different answers to the questions asked.

Fig 1.39 Full- and part-time weekly earnings for Gloucestershire and comparator areas, 2018

Legend:
- Full Time Workers
- Part Time Workers

Y-axis: Weekly earnings (£)

X-axis (District): Gloucestershire, Worcestershire, Oxfordshire, Swindon and Wiltshire, West of England, England
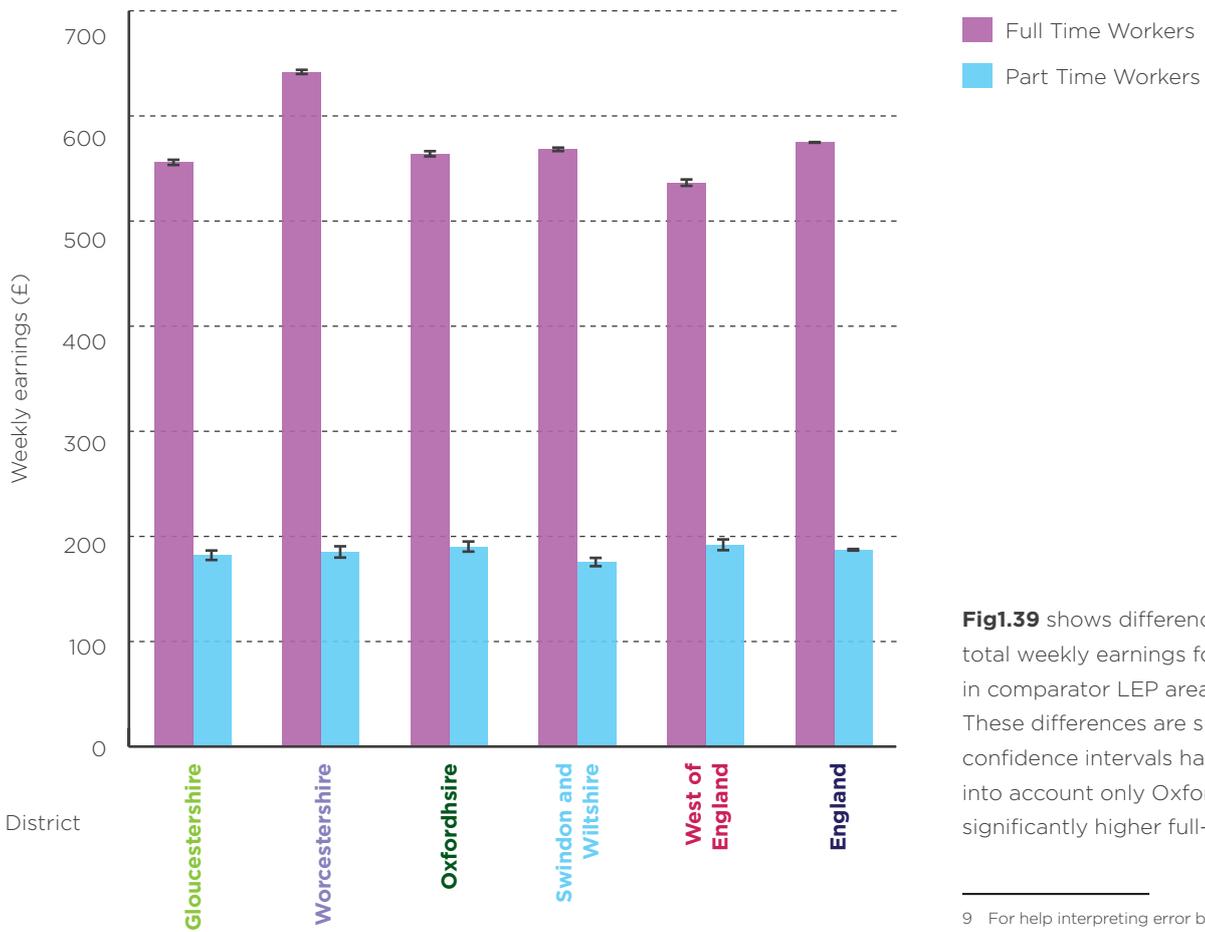
Fig1.39 shows differences in the total weekly earnings for residents in comparator LEP areas. These differences are small and once confidence intervals have been taken into account only Oxfordshire has significantly higher full-time earnings[9].

9 For help interpreting error bars please see Appendix 2

Fig 1.40 Wage inequality between the 25th and 75th percentile for men and women, 2010–18

Legend:
- Male
- Female

Y-axis: Wage inequality (%)

X-axis (Year): 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018

Fig1.40 shows that there is high wage inequality between the 25th percentile workers and the 75th percentile workers for both men and women. Inequality for men is higher than for women, with male inequality between the two percentiles being just below 50%. The data also shows that men have higher weekly wages overall, both for full-time and for part-time work (not shown in the graph).

Ideas

Ideas Summary

1. A higher number of companies are 'innovation active' in Gloucestershire than neighbouring LEP areas; and the county is relatively more specialised in Product and service, Process, and (blue sky) R&D compared to neighbours, despite higher total spend on Strategy and marketing, and Collaboration. This reflects high productivity and export services sectors involved in Manufacturing innovation.

2. Recent large investments from companies active in cyber technology are linked to activities which are deepening and broadening the innovation ecosystem for cyber, AI and associated cross-sector business applications in the area.

3. The cyber-tech sector has been supported by the University of Gloucestershire, who have been developing their offer in this area, including the development of the C11 Cyber Security Training and Conference Centre.

4. In agri-tech, Farm491, co-located with the Royal Agricultural University (RAU) has grown to become the largest UK agri-tech incubator in the last 12 months. The RAU provides critical academic support to fledgling early stage ideas, helping them progress. Campden BRI is a world leader in the agri-food sector supporting companies with practical scientific, technical, research and advisory services in food, drink and allied industries.

5. Historically, some key industrial capabilities in Gloucestershire are the result of cumulative local innovation activity that can be observed via UK open patents data. High numbers of patents in the categories of 'Hydraulics and electronics' and 'Fluid pumps and valve systems' are related to the supply chains for manufacture of undercarriages for aviation, and the production of drilling, mining and pumping equipment. Notable patent activity is also present in the areas of smaller scale medical equipment and 'Bathroom and shower fitting'. The latter is likely to reflect the presence of Kohler Mira Bathrooms in the county (potentially also drawing on diversified elements of 'Pumps, taps and valves' production in the area).

6. Innovate UK has funded a total of 429 projects cumulatively in the county since 2004, with a total value of £168.5m including private partner match funding. Both in terms of number and value, these are clustered around the M5 corridor linking Bristol to Birmingham, capitalising on access to talent and customers in two of the UK's largest urban labour markets outside London.

Business Expenditure on Research and Development

Fig 2.1 Business Enterprise Research and Development by LEP area, 2015

Fig2.1 shows the spending on Business Enterprise Research and Development (BERD) per person in full-time employment. According to this measure, in Gloucestershire £1,079 per full-time employee was spent on BERD. This positions Gloucestershire 13th amongst all LEPs. The average spending on BERD in England is £811 per full-time employee, meaning Gloucestershire is above average. Of the LEPs in the South West region, Gloucestershire is second behind Swindon and Wiltshire, but slightly ahead of the West of England.

Fig2.2 shows Gloucestershire is an innovative LEP, with 70.3% of businesses in the county being 'Innovation Active'. This is higher than all of its neighbours and the 55.1% national average. Across all LEPs, only Cheshire and Warrington places ahead of Gloucestershire. An 'Innovation Active' business is one that introduces new products, engages in innovation projects or implements significantly improved forms of organisation, business structures or practices, referring to activities related to Research and Development.

Fig 2.2 Proportion of 'Innovation Active' businesses, 2015
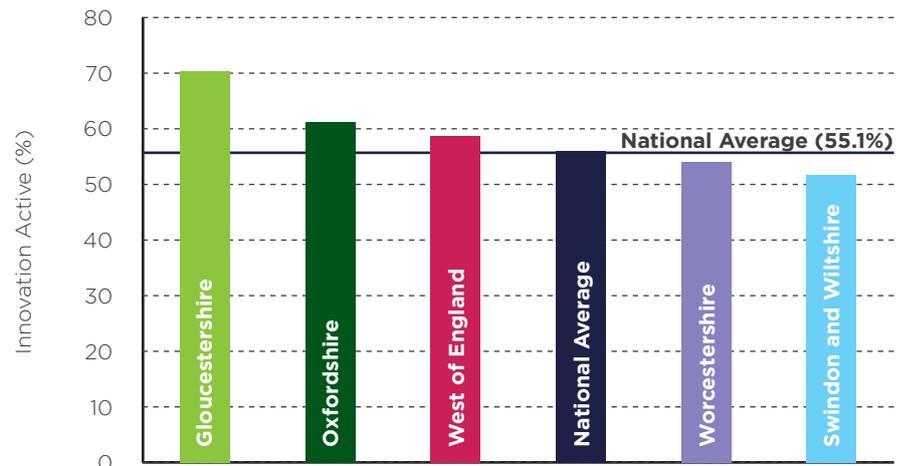
Fig 2.3 Specific innovation metrics by LEP, 2015
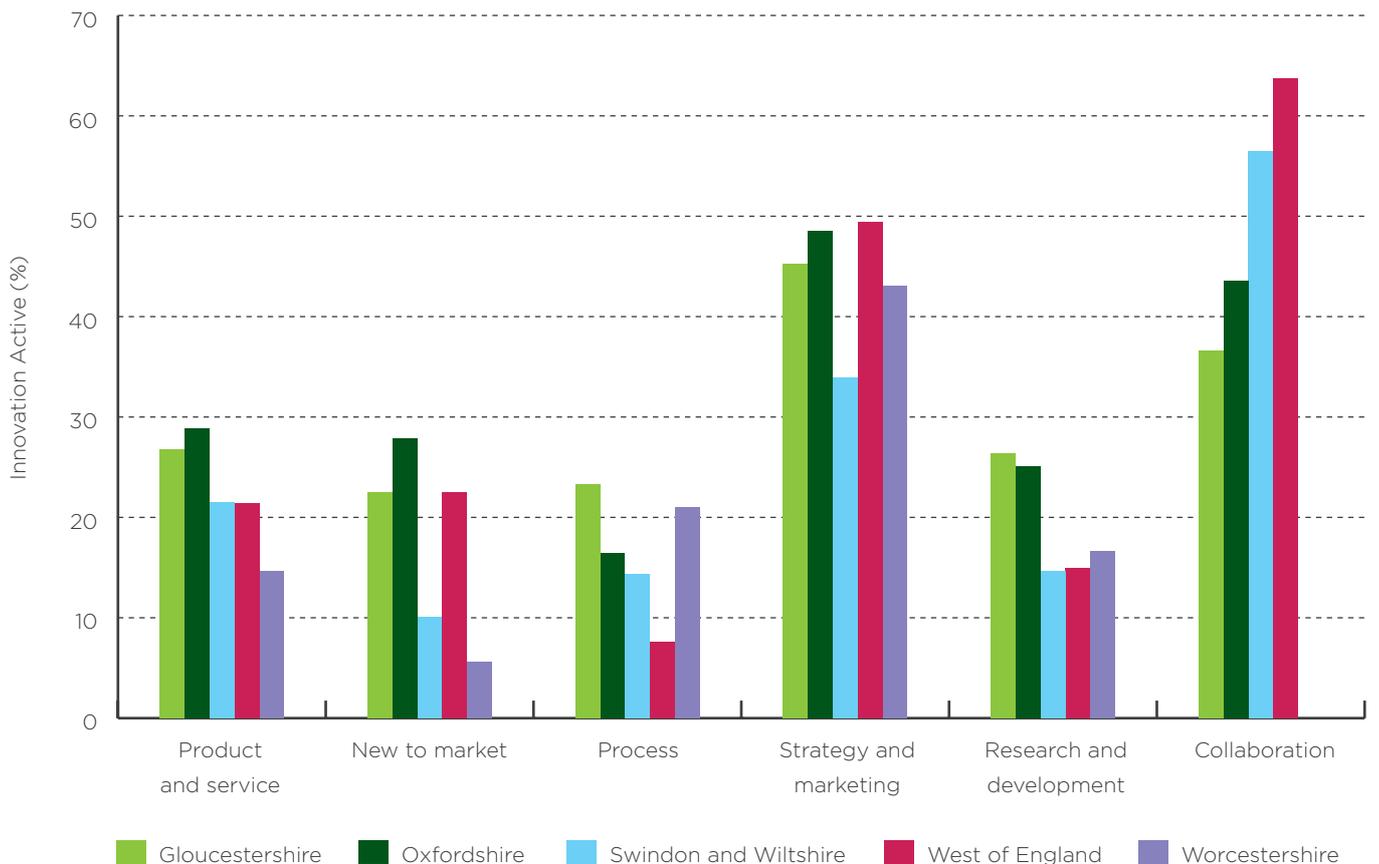
Fig2.3 shows a range of Department for Business, Energy and Industrial Strategy (BEIS) innovation metrics, with Gloucestershire performing comparatively well. The county comes top in two metrics, second in two metrics, while only coming last out of the comparator areas in the Collaboration metric.

Spending and Innovation

Fig2.4 shows the proportion of individuals in Gloucestershire who are employed in various Research and Development (R&D) positions alongside comparator LEPs. This is defined according to accepted standards for jobs in R&D related sectors. Gloucestershire has a higher percentage of individuals employed in science, research, engineering and technological professions than the average for England (5.4%), although the area has proportionally fewer people employed in these sectors than Swindon and Wiltshire, the West of England and Oxfordshire. 1.8% of the total Gloucestershire workforce is employed in the science, engineering and technology associate professions, the same as the England average (1.8%), but below the rate for Swindon and Wiltshire, the West of England and Oxfordshire.

■ % employment in Science, research, engineering and technology professions[10]

■ % employment in Science, engineering and technology associate professions

10   Standard Occupational Classification (SOC) 2010

Fig 2.4 Employment in R&D related sectors, 2014

Fig 2.5 HERD by LEP, 2014 (£ per FTE)
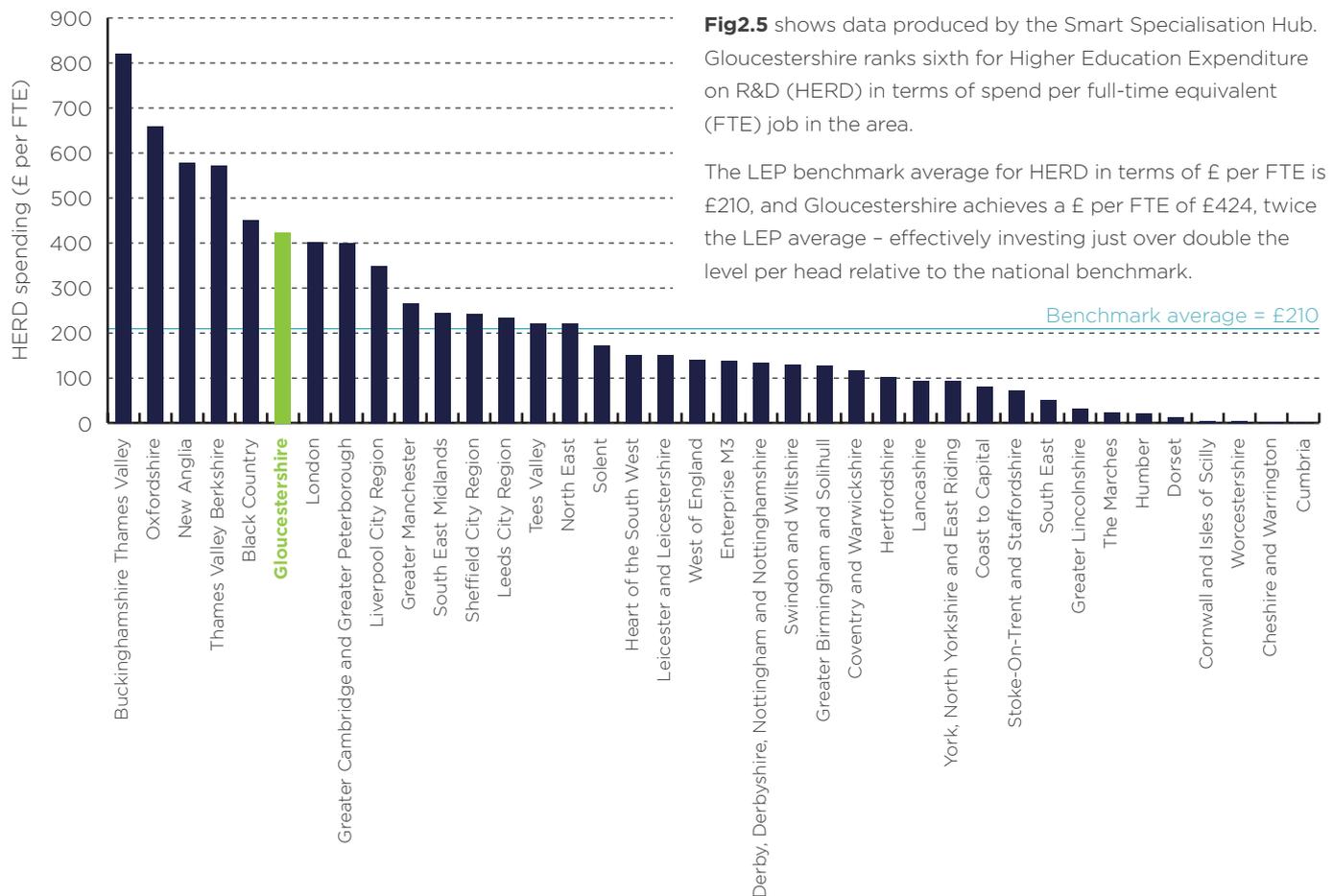
Fig2.5 shows data produced by the Smart Specialisation Hub. Gloucestershire ranks sixth for Higher Education Expenditure on R&D (HERD) in terms of spend per full-time equivalent (FTE) job in the area.

The LEP benchmark average for HERD in terms of £ per FTE is £210, and Gloucestershire achieves a £ per FTE of £424, twice the LEP average – effectively investing just over double the level per head relative to the national benchmark.

Benchmark average = £210

Higher Education Spending on Research and Development

Fig 2.6 Benchmarking HE specialism by number of staff in Research Excellence Frameworks, 2014
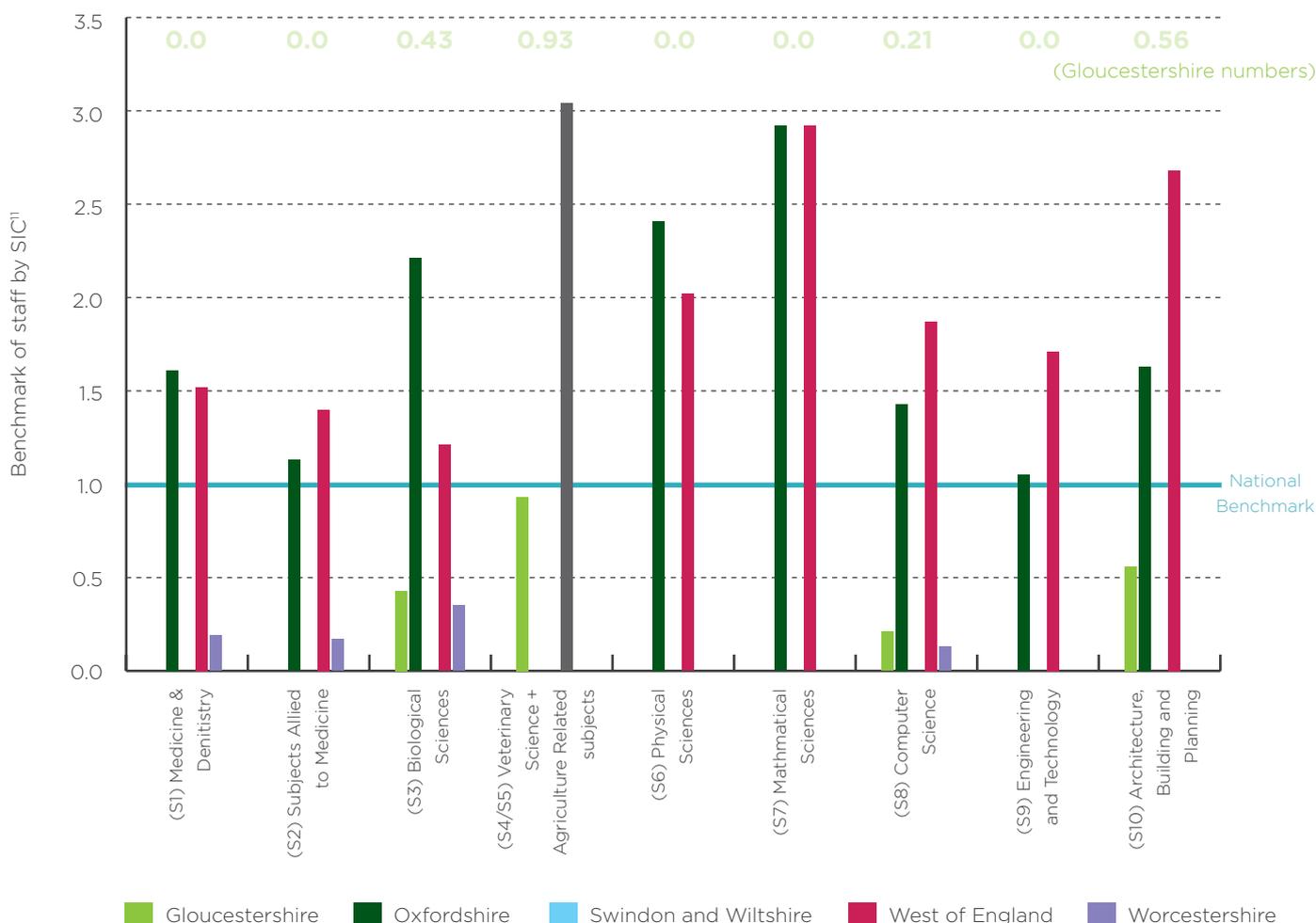
11   Standard Industrial Classification (SIC)

Fig2.6 shows that across nine Research Excellence Frameworks (REFs) Gloucestershire has staff involved in four, though none achieve the national benchmark.

Oxfordshire and the West of England LEP areas have significantly higher numbers of staff involved in REFs in all areas, with the exception of Veterinary Sciences in the case of Oxfordshire.

Gloucestershire has not published any recorded journal papers relating to Innovate UK's key industrial priorities.

In the case of the eight great technologies research specialisms there have been five research papers published within Gloucestershire: two on agri-tech, two on regenerative medicine, and one on satellites. This is a relatively low total and represents a benchmark of zero in all eight areas.

Innovation at Anchor Institutions

The county is home to a number of active innovation institutions, which are well-placed to pursue greater collaboration to amplify their impact.

Campden BRI

Campden BRI is a world-leading research association in the agri-food space and member of the South West AgriTech Network. This network was inaugurated at Farm491 in Summer 2018 to connect research institutions across the south west with technological innovations and industry partners in agriculture.

Hartpury University and College

Hartpury University and College is a specialist provider of high-quality applied education, training and research. Their industry-led research and commercial partnerships within the specialisms of animal, in particular equine, and sport, result in innovative solutions, which impact and influence locally, nationally and internationally the development of these same sectors.

In addition, the Hartpury Agri-Tech Centre, due to open in September 2019, will provide farming professionals with access to the latest livestock technology, expertise and ideas, ensuring Hartpury University and College is at the heart of innovation in the agricultural sector.

Royal Agricultural University (RAU)

Innovation has been central to the RAU's purpose since 1845 and their alumni lead transformational change across the land-based sector. With the challenges of Brexit and food security, the RAU has never been more relevant, continuing to provide innovative, sustainable solutions for land managers, food producers and the wider rural economy. This is achieved through (i) innovative education programmes, supported by a government post-Brexit strategic initiative, co-designed with industry to ensure that businesses have the skills needed to face the future, (ii) a nationally recognised centre of excellence for student entrepreneurship, (iii) applied research, and (iv) a Knowledge Exchange Hub that pioneers farmer-led innovation and supports the agricultural and wider business sectors through the LEP-funded Farm491 project, as well as businesses of all types through the Cirencester Growth Hub.

University of Gloucestershire (UoG)

Within its School of Business and Technology and its Cyber and Digital Innovation Centre (at C11), UoG undertakes research and knowledge exchange activities that support innovation in the region and beyond. Many of these activities are supported by government grants to deliver innovative solutions in areas related to cyber technology and business growth.

Researchers at UoG are involved in activities across applied innovation, creating educational materials, intervention processes and courses for HE students and business leaders, to improve and accelerate innovation across Europe.

UoG is also working with a number of other universities, businesses and government agencies on the Cheltenham Cyber Park ('Cyber Central'). This is expected to host the National Centre for Cyber Security (NCSC's) National Cyber Innovation Centre, a dedicated facility to harness government expertise to develop UK cyber capability and businesses. UoG aims to set up a dedicated research and education facility for the development of cutting-edge research in cyber technology as well as the skills to support neighbouring businesses. This includes a dedicated hub to house indigenous cyber start-ups, which is expected to originate in part from the NCSC and its innovation centre, as well as the larger corporates that will be located on the park.

UoG also hosts the Countryside and Community Research Institute (CCRI) which operates at the interface of agriculture, environment and society, on issues relevant to rural, urban, and regional development. Their work enables them to apply innovative cross-disciplinary research approaches to complex problems facing communities and society in the UK, Europe and beyond.

Patents in Gloucestershire

Fig2.7 and the table below it show a cumulative total of 2,618 patents filed in Gloucestershire up to July 2018. The ONS's UK Patent Open Dataset reveals that top patent-filing companies are focussed around some particular sectors and specialisms. Interpreting the patent data text, and cross checking against online company descriptors suggests that key areas of innovation activity include:

- Hydraulics and electronics
- Fluids and pumps
- Aviation and landing systems
- Advanced Engineering Specialisms
- Medical instruments and equipment
- Property related: Bathrooms and windows

Each of these industrial capabilities/sector specialisms is built up from the activities of more than one company in each case. The list below shows the companies in Gloucestershire that have filed the most patents, with the total number of filed patents per company in brackets, followed by their district location.

1. GE Aviation (139) **Tewkesbury**
2. CAMCO Drilling (103) **Stroud**
3. Kohler Mira Bathrooms (94) **Cheltenham**
4. Dowty fuels, seals electronics and hydraulics (89) **Cheltenham**
5. Spirax-Sarco fluids and pumps engineering (73) **Cheltenham**
6. Securistyle property and windows (49) **Cheltenham**
7. Corin medical orthopaedics (43) **Cotswold**
8. Epwin property doors and windows (43) **Cheltenham**
9. Safran Landing Systems aviation (39) **Tewkesbury**
10. Arjo Medical beds (38) **Gloucester**
11. NOV Downhole Eurasia drilling (30) **Stroud**
12. Meco Mining subterranean electronics (23) **Tewkesbury**

This analysis reveals incumbent clusters; to look at the emerging innovation pipeline we can look at current R&D.

Fig 2.7 Count of registered patents by district within Gloucestershire, 2018
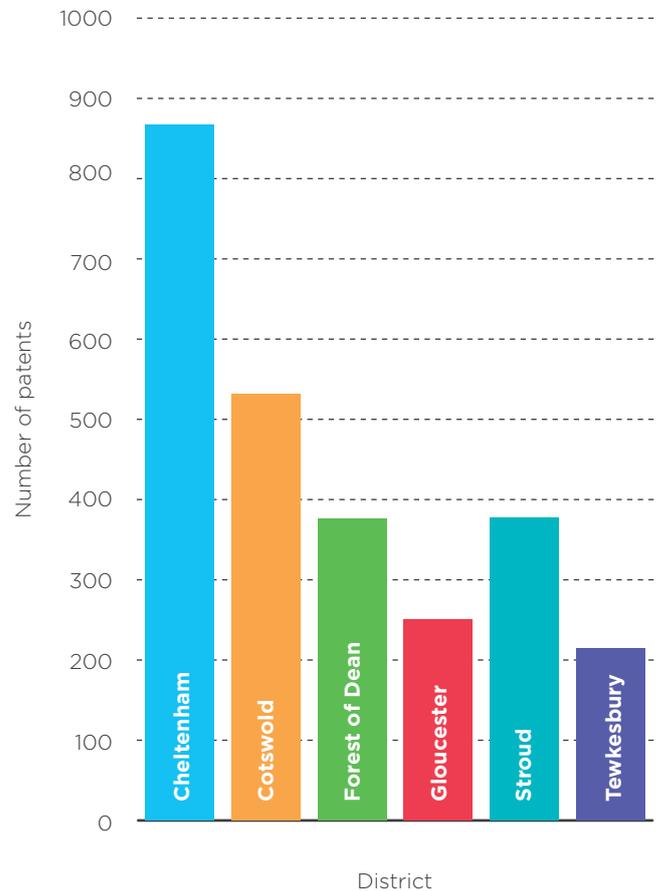
District	Count of registered patents	% of total
Cheltenham:	868	33%
Cotswold:	532	20%
Forest of Dean:	376	14%
Gloucester:	250	10%
Stroud:	378	14%
Tewkesbury:	214	8%

Ideas Spotlight: Innovate UK Funded Projects in Gloucestershire

Innovate UK is a semi-independent (non-departmental) technology and investment arm of the UK government, previously 'The Technology Strategy Board'. Innovate UK has funded a total of 429 projects in Gloucestershire since 2004. The total value of Innovate UK funding over the period was £79,163,867, supporting total project investment of £168,513,519 including match funding from recipients.

These investments are targeted at unlocking future private sector innovation activity and investment.

Fig 2.8 Innovate UK investment, 2004–19

District	Number of Investments	Total Funding	Share of Gloucestershire total
Tewkesbury	84	£101,115,051	60%
Stroud	89	£24,184,659	14%
Cheltenham	92	£18,996,215	11%
Cotswold	80	£11,730,514	7%
Gloucester	39	£6,078,950	4%
Forest of Dean	45	£6,408,130	4%

Fig2.8 shows the distribution of 429 Innovate UK projects in Gloucestershire, with the number and value of projects listed by district. Innovation activity is well spread between the six districts of Gloucestershire, although there is a considerable concentration in Tewkesbury.

Innovation activity in the Cotswold and Forest of Dean districts is not insignificant in terms of the number of projects, but tends to be driven more by small businesses, therefore individual awards are smaller.

Fig 2.9 Key Innovate UK investments, 2004–19

Company	Total Investment
GE Aviation Systems Limited	£58,026,984
Safran Landing Systems UK Limited	£27,435,987
Renishaw PLC	£13,480,068
Messier-Dowty Limited	£8,925,256
Chronos Technology Limited	£3,708,179
EDF Energy Nuclear Generation Limited	£2,818,998
Horsebridge Network Systems Limited	£2,471,473
Howard Tenens Limited	£2,387,614
Corin Limited	£1,995,044
MTT Technologies Limited	£1,919,700

Fig2.9 shows key projects receiving higher levels of funding
on a company basis, showing the highly innovative companies
within Gloucestershire which qualify for Innovate UK funding.

Infrastructure

Infrastructure Summary

1. Rail Infrastructure is generally good within Gloucestershire, although there are some limitations. Current physical rail infrastructure could be better exploited to achieve quicker or more regular services. The Cross-Country route (the main railway line between Bristol and Birmingham) runs through Gloucestershire, serving Cheltenham. This offers a better connection to Bristol and Birmingham than services from Gloucester, which is on a branch line of this route. Bus connection is limited in rural areas, but more extensive in urban areas. More can be done to improve connections across all parts of the county.

2. Cycling provision in the main urban areas is better than in rural areas, though there is room for much better provision to be made. Of all the district areas, Cheltenham appears to have achieved the most optimal co-location between skills and business with 24% of residents either walking or cycling to work, however, car use is high in rural areas.

3. Commercial floorspace in Gloucestershire is predominantly industrial, with 60% of total space dedicated to industrial uses compared to 55% in England. This reflects the county's relative specialisation in Manufacturing, and the relative availability of rural land for industrial business parks. Cheltenham and Gloucester as urban settings have lower proportions of industrial space and are more specialised towards office and retail provision.

4. In terms of natural capital and conservation the Ecosystem Services provided in the area are recognised as an asset supporting tourism, business and quality of life. Surveys have highlighted that young people place a high value on the environment[12]. Gloucestershire's natural environment can therefore act as an asset to attract talent to the area, which must be balanced with the need to provide housing and employment land for development.

5. The 'Fastershire' initiative is supporting digital infrastructure roll-out which has the potential over time to lower commuting requirements by enabling more independent working, also shifting the nature and type of requirements for employment land.

6. The data economy is leading growth in Gloucestershire in terms of business formation and entrepreneurialism, but new business models are creating increasing demand for data infrastructure.

12   Cirencester College student induction survey and GFirst LEP Magnet County Youth Survey

Gloucestershire Rail Links and Usage

The map below highlights travelling times to major destinations, while the table outlines total passenger entry and exits from each Gloucestershire station.

Direct trains run to London from Gloucester (1 hour 55 minutes), and Cheltenham Spa (2 hours 15 minutes), both via Stroud and Swindon.

Birmingham is 40-45 minutes direct from Cheltenham; Cardiff is 1 hour 5 minutes from Gloucester; and Bristol is 52-80 minutes (direct/with change) from Gloucester, or 40-65 minutes from Cheltenham as trains run more directly.

Stroud to Swindon is 30 minutes direct; but Stroud to Bristol is 1 hour 30 minutes+. Cam & Dursley is just 38 minutes to Bristol. Moreton-in-marsh connects to Oxford in 26 minutes, or northwest to Worcester in 45 minutes.

Moreton-in-Marsh > Worcester — 0 hrs 45 mins

Moreton-in-Marsh > Oxford — 0 hrs 26 mins

Gloucester > Cardiff — 1 hrs 15 mins

Cheltenham > Birmingham — 0 hrs 45 mins

Gloucester > London — 1 hrs 55 mins

Stroud > Swindon — 0 hrs 30 mins

Cam & Dursley > Bristol — 0 hrs 38 mins

Key

Motorways   A Roads   Railways   Train Station   District Boundaries

0 2 4   8   12   16   20 km
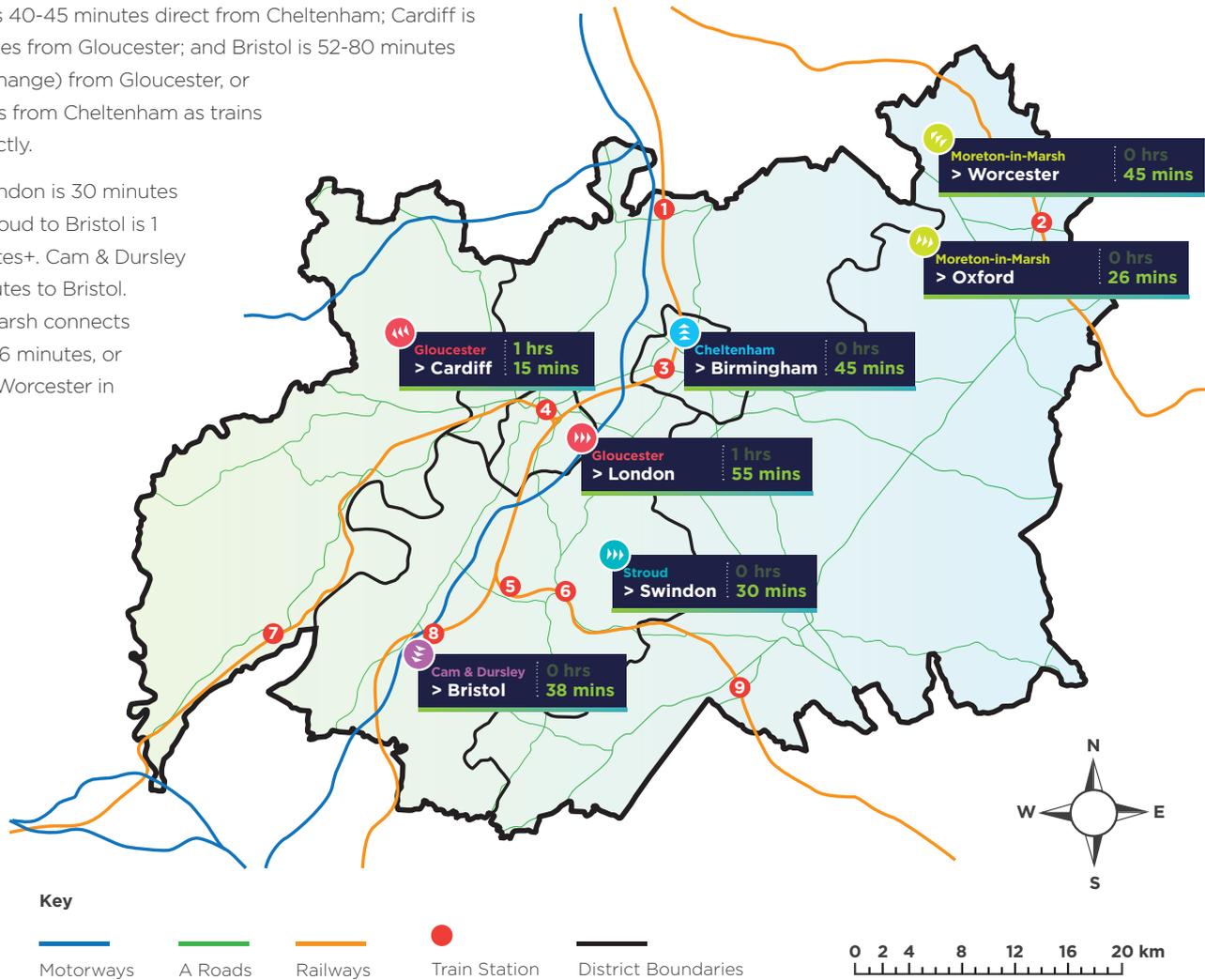
Station	Entries and exits	Interchanges
1 Ashchurch	101,238	
2 Moreton-in-marsh	268,866	
3 Cheltenham	2,400,434	191,483
4 Gloucester	1,477,988	72,090
5 Stonehouse	153,600	

Station	Entries and exits	Interchanges
6 Stroud	544,270	
7 Lydney	195,532	
8 Cam & Dursley	188,918	
9 Kemble	372,686	

In 2017–18, according to the Office for Road and Rail (ORR) nine stations in Gloucestershire had a total of 5,703,532 entries and exits, and a further 263,573 interchanges (all at either Cheltenham or Gloucester).

The total entries and exits increased by 1.4% or 78,806 from the previous year. The table below shows that Cheltenham and Stroud have contributed 81% of this net increase.

2016-17 to 2017-18 Station	Passenger numbers Change	Percentage change
Cheltenham Spa	47,722	2.0%
Stroud	15,450	2.9%
Moreston-In-Marsh	8,760	3.4%
Ashchurch	6,994	7.4%
Lydney	6,692	3.5%
Kemble	5,496	1.5%
Stonehouse	1,512	1.0%
Gloucester	-1,550	-0.1%
Cam & Dursley	-12,270	-6.1%
Glos Total	**78,806**	**1.4%**

Housing

The total housing stock in Gloucestershire in 2018 was approximately 288,158 units, while the total population of Gloucestershire was 628,139, meaning (ignoring second homes) Gloucestershire has an average of 2.18 people per household. Significant housing growth is planned for in the county's local plans, including the Joint Core Strategy for Gloucester, Cheltenham and Tewkesbury. The plans will require additional housing delivery of around 60,000 new homes to 2031.

Fig 3.1 **Gloucestershire housing stock by district, 2017/18**

14% Tewkesbury

19% Cheltenham

18% Stroud

15% Cotswold

19% Gloucester

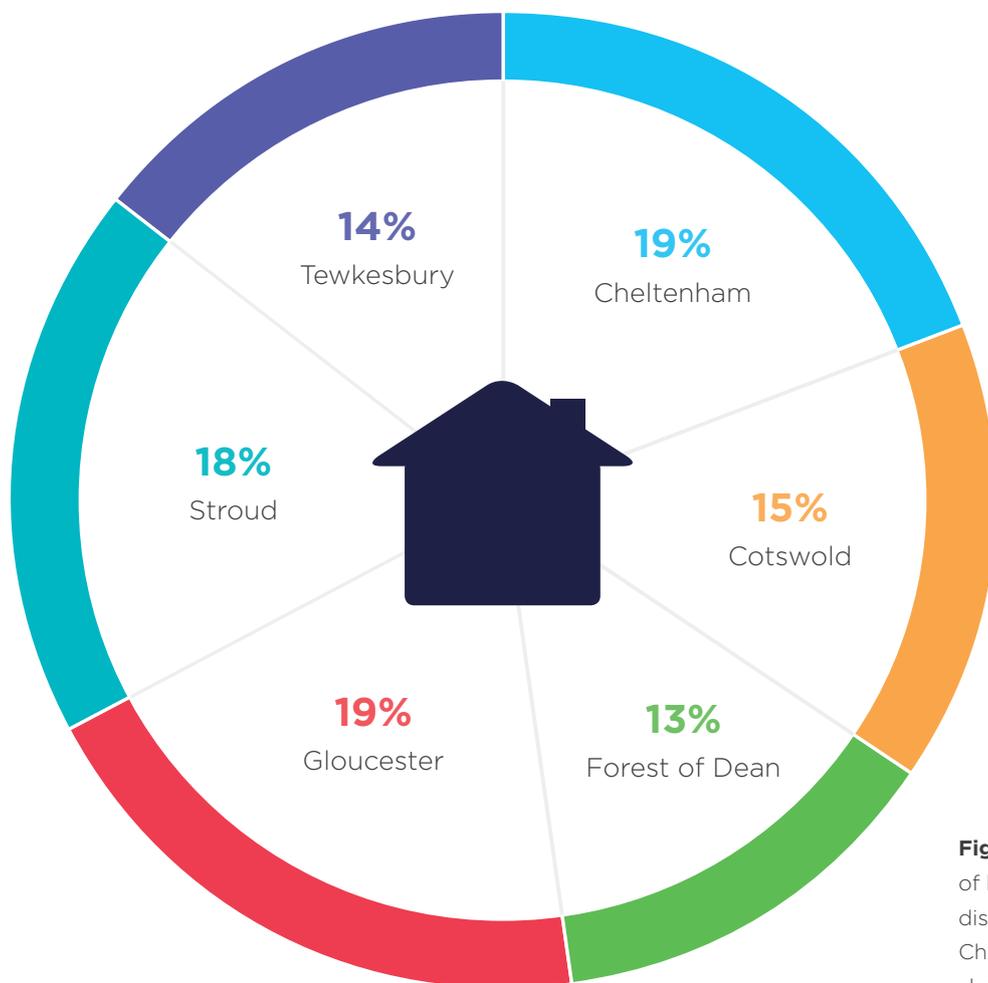**13%** Forest of Dean

Fig3.1 demonstrates the breakdown of housing in Gloucestershire by district. As expected, Gloucester and Cheltenham both have the largest share of housing at 19% each, with housing stock in the two districts at approximately 56,164 and 55,320 units respectively. The Forest of Dean contains the fewest housing units, making up 13% of total housing or roughly 38,183 units.

Fig 3.2 Growth in housing since 2000

Cheltenham   Cotswold   Forest of Dean   Gloucester   Stroud   Tewkesbury
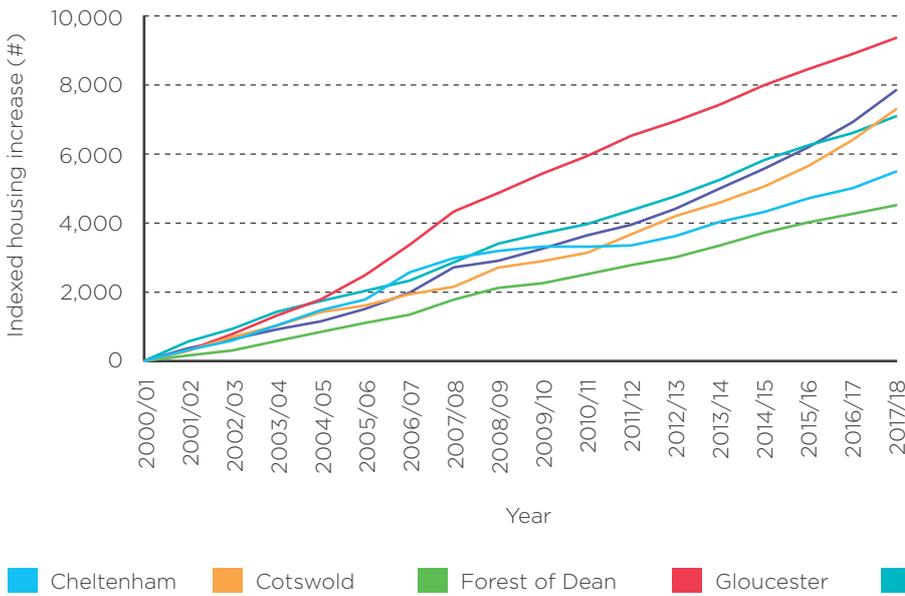
Fig3.2 shows the cumulative growth in housing over the period, starting in the year 2000/01. Over the period, Gloucester has had the largest absolute growth in housing, with over 9,500 additional units, a growth rate of 16%. Tewkesbury has also had significant growth compared to other districts, growing in absolute terms by 7,531 units, an increase of 18%. The Forest of Dean has seen the smallest absolute growth over the period, with 4,414 additional units built. There is a notable lack of housing stock growth in Cheltenham, with just 5,392 new houses built, a growth in housing stock of just 10%.

Fig 3.3 Absolute house building by LEP per year

Fig3.3 and **Fig3.4** show growth in housing stock in Gloucestershire and neighbouring LEP areas. There has been an increase in year-on-year house building within Gloucestershire over the period, with the county significantly adding to its housing stock. 2017/18 saw a significant increase in new housing stock.
As a percentage of total housing, Gloucestershire built the second highest number of houses, although this will need to be sustained to meet housing targets.

Gloucestershire
Oxfordshire
Swindon and Wiltshire
West of England
Worcestershire

Fig 3.4 New units as a % of total housing per year

Housing Affordability and Tenure

Gloucestershire has an overall median housing affordability ratio of 8.5 in 2018.
This ratio is calculated by dividing house prices by workplace gross annual earnings.
A lower ratio figure therefore suggests that houses are more affordable.

Fig 3.5 Affordability ratio over time for the Gloucestershire districts, 2011–18

Cheltenham · Cotswold · Forest of Dean · Gloucester · Stroud · Tewkesbury

Fig3.5 shows the change in affordability ratio over time. In particular, this shows that Cotswold district has remained by far the area of least affordable housing, while the reverse is true for Gloucester. All districts have seen a small increase in the affordability ratio over the period, due to the rise in house prices at the same time as wages have been stagnating. In many respects, it is unsurprising that Cotswold has such a high affordability ratio, particularly due to the Area of Outstanding Natural Beauty limiting the possibility of house building.

Fig 3.6 Workplace housing affordability ratio for each Local Authority area within comparator LEPs, 2018
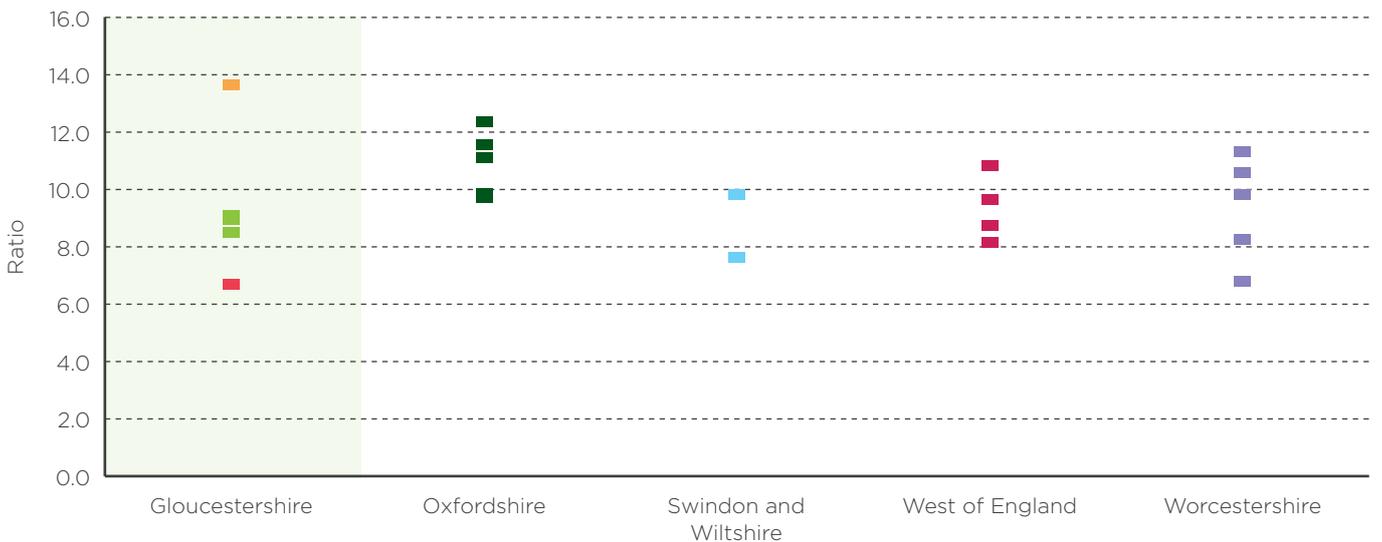
Fig3.6 shows the range in the affordability ratio for Local Authorities in Gloucestershire and each of the comparator LEP areas, each dot representing an individual authority. Gloucestershire has the largest range in affordability of all the areas, with Gloucester having the most affordable housing of all comparator areas (at 6.68) while Cotswold has the least affordable (at 13.63), compared to the next highest area (South Oxfordshire at 12.36). However, both Oxfordshire and Worcestershire have a higher overall affordability ratio than Gloucestershire, at 10.44 and 8.88 respectively.

Fig 3.7 Housing tenure by district, 2013

Legend:
- Owner-occupied (no mortgage)
- Owner-occupied (with mortgage)
- Social rented
- Private rented
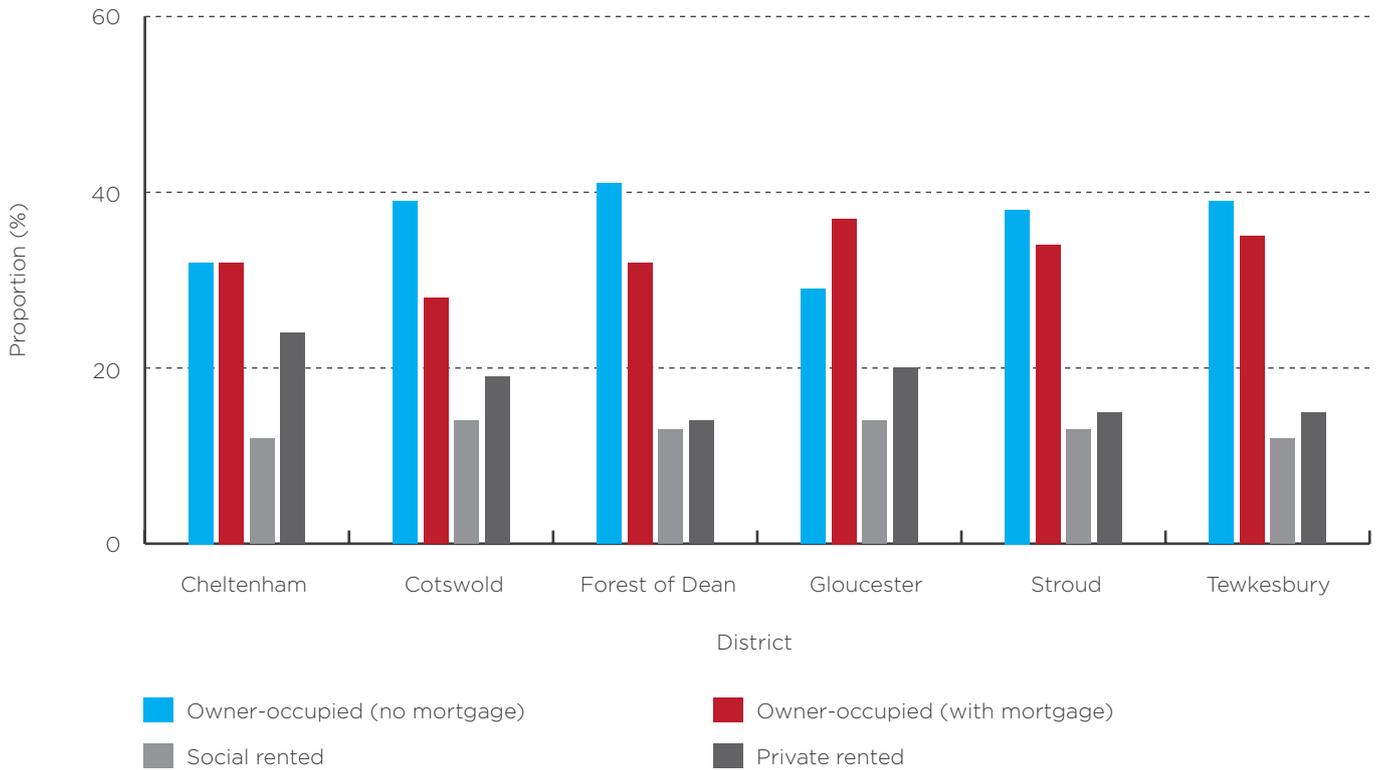
Fig3.7 shows the housing tenure for the six Gloucestershire districts. The proportion of households in the social rented sector is roughly the same in each district, at around 13%, with the proportion slightly higher in Gloucester at 14% and slightly lower in Tewkesbury at 12%. Owner occupied housing makes up over 50% of total households in each district, with variations in the levels owned with and without a mortgage. The proportion of households in the private rented sector is higher in Cheltenham, Gloucester and Cotswold, at around 20%.

Fig 3.8 Housing tenure in Gloucestershire,2013

- 18% Private Rented
- 13% Social Rented
- 33% Owner-occupied (with mortgage)
- 36% Owner-occupied (no mortgage)
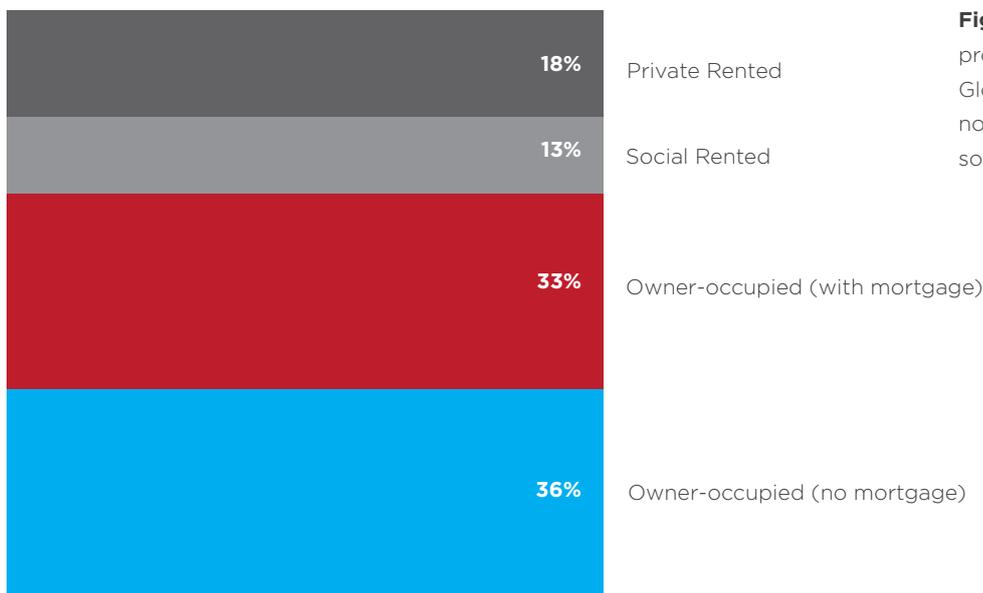
Fig3.8 shows that the largest proportion of households in Gloucestershire are owned with no mortgage, and that 13% are social rented homes.

The Commercial Floorspace Composition in Gloucestershire

Commercial floorspace tells a similar story to housing, with modest growth, but more potential to unlock.

Fig 3.9 **Commercial floorspace breakdown by district (m²), 2016**

Legend:
- Office
- Retail
- Industrial
- Other

Charts: Cheltenham, Cotswold, Forest of Dean, Gloucester, Stroud, Tewkesbury
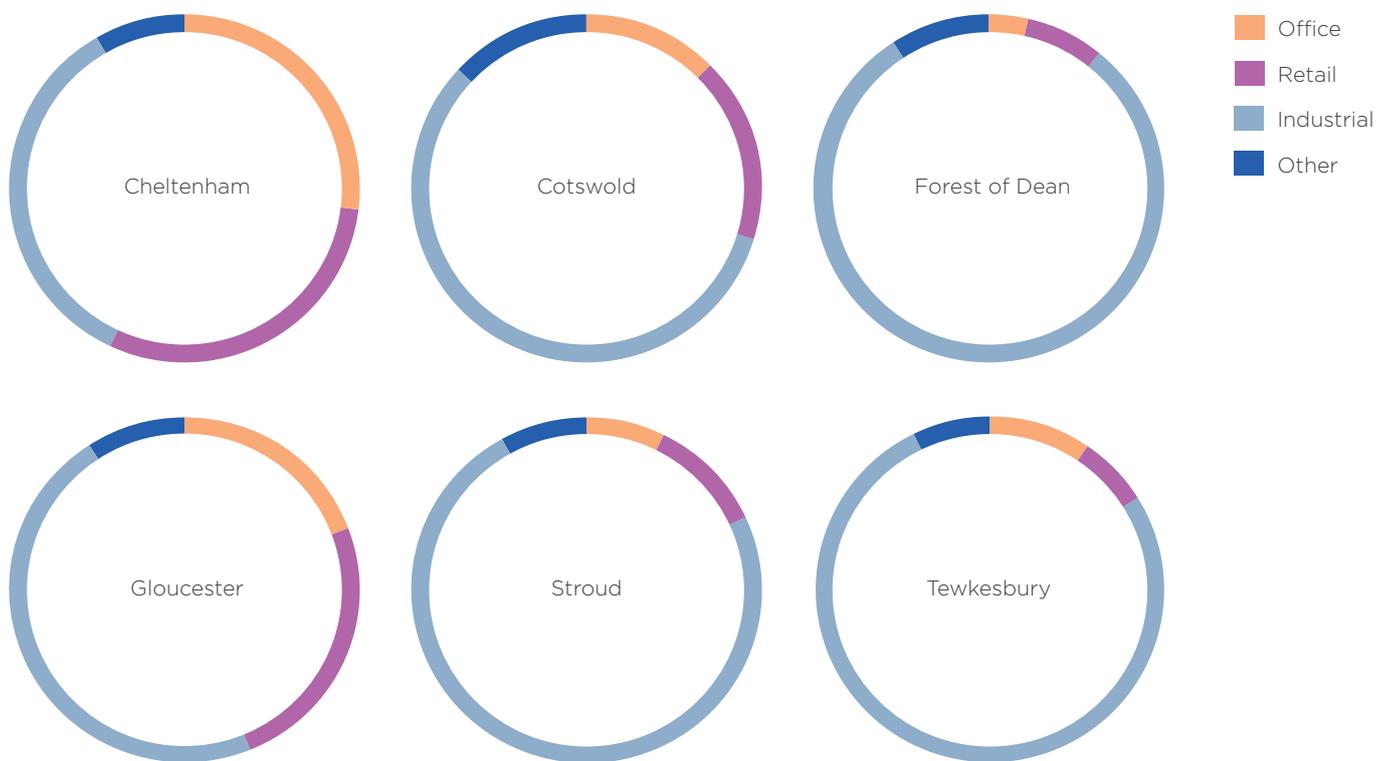
Fig3.9 demonstrates the breakdown of commercial floorspace within Gloucestershire by district. Cheltenham and Gloucester, the two more urban districts, are also the two districts with a more mixed commercial floorspace composition and are the only two with less than 50% of the commercial floorspace being industrial. These two districts have more of a retail offer, at 30% of floorspace in Cheltenham and 25% in Gloucester. Similarly, the total commercial floorspace taken by offices is also higher than other districts, at 27% and 19% respectively. Conversely, floorspace in the Forest of Dean leans very heavily towards Industrial, with this making up 80% of its total floorspace, while Tewkesbury has 77% industrial floorspace.

Fig 3.10 Commercial floorspace breakdown by LEP (m²), 2016
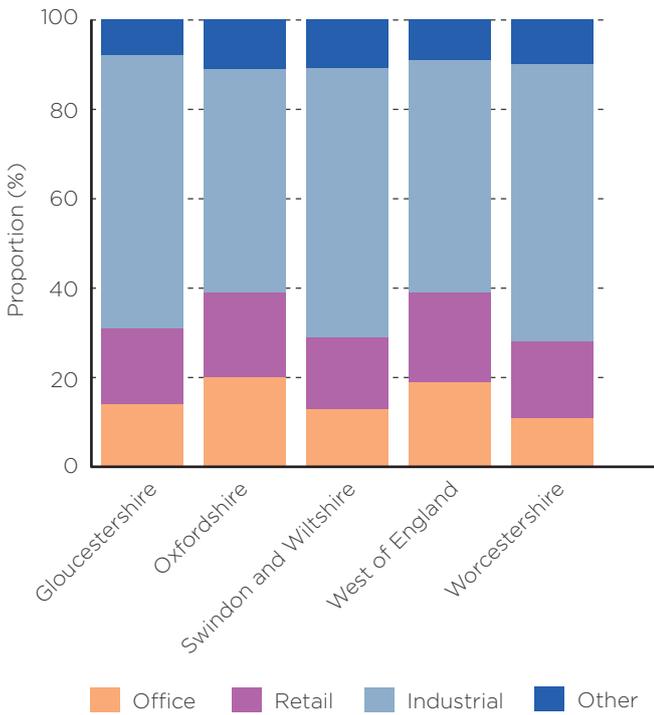
Fig3.10 shows the total floorspace make-up for Gloucestershire compared to other areas. Gloucestershire has a broadly similar make-up of commercial floorspace to other LEPs in the South West and to the England average, although there are interesting trends in the detail, with Gloucestershire overall having slightly less total floorspace (m²) than the comparator areas (not shown).

Fig 3.11 Growth in floorspace by district (000 m²), 2016
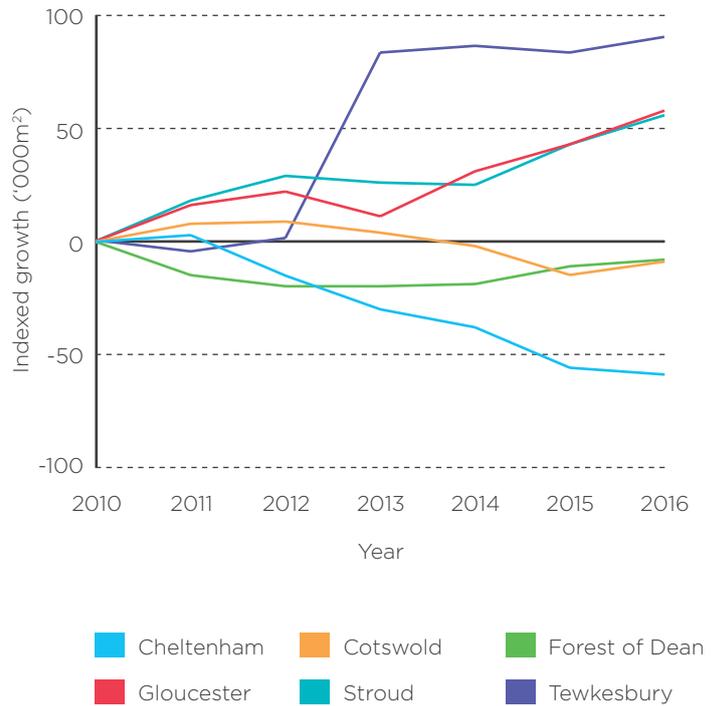
Fig3.11 shows growth in floorspace by district. This shows that, over the period, Cheltenham has seen a reduction in its floorspace of 59,000m². Conversely, Tewkesbury has seen an increase of 91,000m², with both Gloucester and Stroud also seeing increases of about 50,000m². Gloucester has the highest total floorspace of all the districts. Overall, Gloucestershire has seen an increase in floorspace of 124,000m² since 2010.

Fig 3.12 Growth in floorspace by LEP (000m²), 2010–16
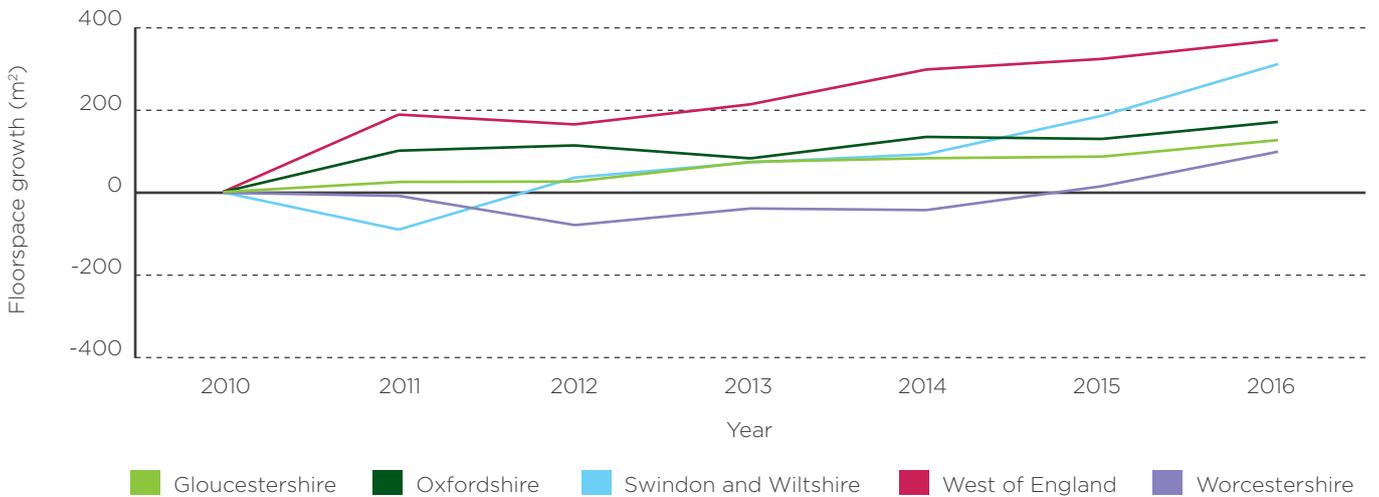
Fig3.12 shows the overall floorspace increase compared to indexed neighbouring LEP areas. West of England and Swindon and Wiltshire have seen much higher increases in commercial floorspace than Gloucestershire from 2010 to 2016. Swindon and Wiltshire has seen an increase of more than double that of Gloucestershire.

Business Environment

Business Environment Summary

1. Gloucestershire has a healthy job-density score, with local businesses providing 0.88 jobs for every Gloucestershire resident. The size profile of the Gloucestershire business base is broadly consistent with the national average, although perhaps slightly skewed towards small and micro-enterprises relative to regional and national business structure profiles.

2. In terms of providing locations for start-ups, Gloucestershire has done well and currently has very high business density per head relative to regional or national levels. However, significant entrepreneurial and business formation strengths in Cotswold district are not replicated in the Forest of Dean and Gloucester. Gloucester, as an urban setting, has notable numbers of large businesses but low 'employment density' compared to other Gloucestershire locations, appearing to have, to some extent, 'crowded out' new business formation. The Forest of Dean as a rural setting seems to lack comparable attributes for driving start-ups at the rate seen in Cotswold district.

3. The top four of the ten sectors driving business formation – and a further sub sector placing 10th – highlight a cluster of knowledge intensive services focussed around IT and digital computing emerging in the county (Management consultancy; Computer consultancy; 'Other' business support; Activities auxiliary to finance and insurance; Business and domestic software development). Many of these businesses are new, and consequently on average smaller, but represent an important trend of emerging new business clusters and associated skills.

4. In relation to the Cyber cluster, the Cyber Resilience Alliance Science and Innovation Audit[13] has identified 11 key anchor firms in the industry within Gloucestershire, which have benefitted from several recent investments. The business environment encountered by this sector-cluster is benefitting from helpful 'policy-tailwinds'; and a growing cluster of relevant skills. These are being supplied by local education institutions, key local employers such as GCHQ, and by the organic and fast-developing local cluster of knowledge-intensive computing services.

5. Financial services are the most significant export in terms of value produced by the wider region including Gloucestershire, totalling £1,495m in annual revenues. However, when looking at the relative comparative advantage against other exporting areas and drawing on knowledge of local high-value industry clusters it is Manufacturing (of transport equipment) that appears as Gloucestershire's 'revealed comparative advantage'. Specifically, the manufacture of landing systems for the aviation sector. There are complementary local supply chains around hydraulics, pumps and chassis manufacture. Possibly related to this is a secondary cluster of high value engineering.

6. Four Gloucestershire businesses feature on the most recent Sunday Times HSBC International Track which tracks the fastest growing mid-sized British businesses by international sales. The four within Gloucestershire are: Off-Piste Wines, a Cheltenham wine wholesaler at 94th; ADEY, a Cheltenham heating filter manufacturer at 111th; Corin Orthopaedics, a Cirencester Orthopaedic parts maker at 118th, and Dairy Partners, a cheese maker based near Stroud at 134th.

7. Gloucestershire has a predominantly small and micro business base, with businesses employing under 50 people comprising 97.3% of the business base, compared to 97.2% in the South West region and 97% across England.

---

13 Involving GFirst, Swindon and Wiltshire, Worcestershire and The Marches LEPs

The Structure of the Gloucestershire Business Base

Fig 4.1 **Comparative incidence of businesses by employee numbers as a per cent of all businesses against the England benchmark, 2018**

Gloucestershire   **Oxfordshire**   **Swindon and Wiltshire**   **West of England**   **Worcestershire**

Fig4.1 highlights that Gloucestershire has a lower share than nationally for all business size bands employing over 50 people. Relative to comparator LEP areas and the South West region (not shown in the graph), Gloucestershire also has lower shares of larger businesses as a percentage of all businesses. This appears to suggest that Gloucestershire has a healthy culture of entrepreneurialism and micro-business formation. However, this may not be translating into growing employment generation (scaling up) over time to the extent of some neighbouring areas, or the national benchmark.

Fig 4.2 **Small and micro businesses share in Gloucestershire and districts, 2018**
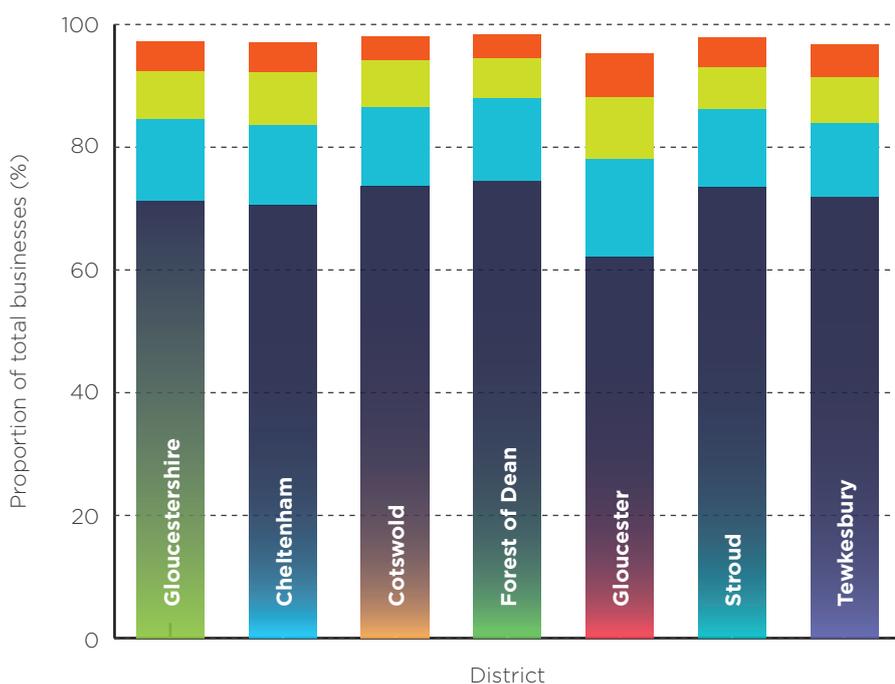
Fig4.2 shows that small and micro-employers are relatively evenly distributed across the six districts of Gloucestershire with respect to the resulting structure (though not necessarily the scale) of cumulative business formation. The Forest of Dean has the highest share of micro businesses, while Gloucester has the lowest.

- 0-4 employees
- 5-9 employees
- 10-19 employees
- 20-49 employees

Fig 4.3 Medium and larger businesss share in Gloucestershire and districts, 2018

Fig4.3 spotlights the share of medium and larger businesses in the six districts and Gloucestershire. Gloucester has a notable share of larger businesses.

Legend:
- 50-99 employees
- 100-249 employees
- 250-499 employees
- 500-999 employees
- 1000+ employees
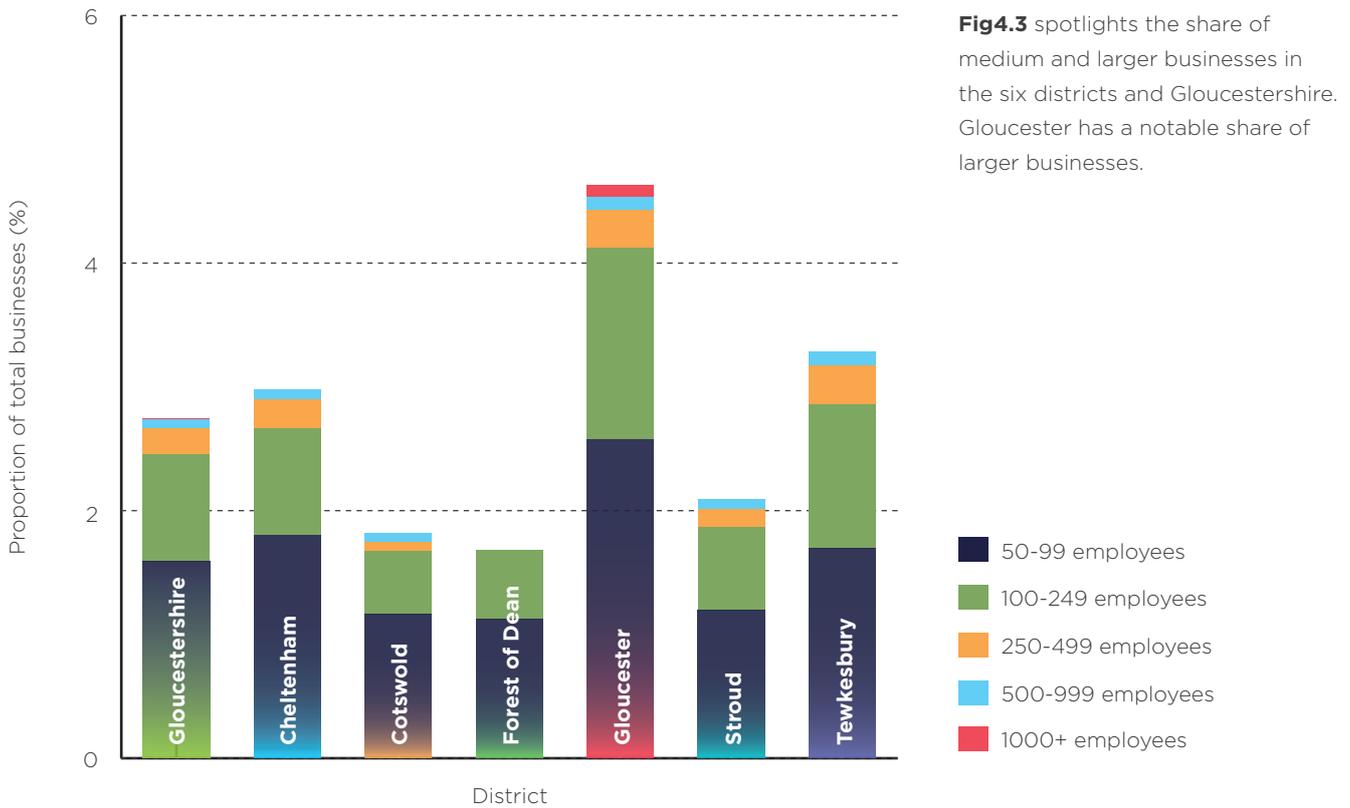
Fig 4.4 Business formations and employee growth in Gloucestershire and districts, 2010–18

Legend: Business formation — Employee growth
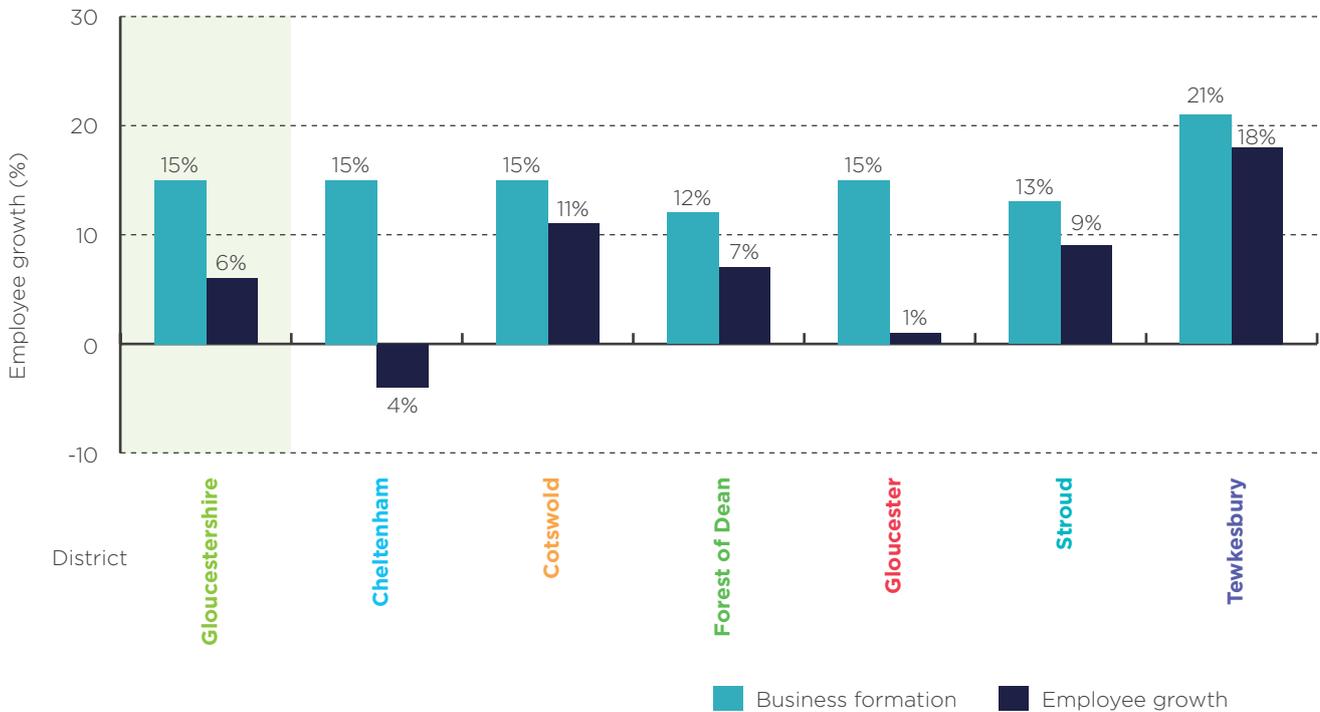
Fig4.4 highlights that business formation (+15%) has been more dynamic than employment growth performance (+6%) since 2010. Tewkesbury has the greatest per cent change in both measures. Cheltenham has seen a fall in employees (primarily in defence).

Start-ups and Entrepreneurialism in Gloucestershire

Data from ONS Business Demography shows that the number of 'active' businesses in the Gloucestershire area increased from 26,415 to 29,960, an increase of 3,545 or 13.4% from 2012–17.

Fig 4.5 Businesses per 10,000 working-age population, 2012–17

Fig4.5 shows that Gloucestershire began and ended the period 2012 to 2017 with a higher number of businesses per head than the South West region and England, but lost some of its advantage over the period. Both the South West region and England have closed the gap from 2012, suggesting that the county (or parts of it) has not kept pace with entrepreneurial activity across England.

- Gloucestershire
- South West
- England

Fig 4.6 Businesses per 10,000 working age population in Gloucestershire districts, 2017

Fig4.6 highlights the business density per 10,000 working age population. Cotswold has the highest level at 1144 businesses per 10,000, while Gloucester has the lowest at 511 businesses per 10,000.
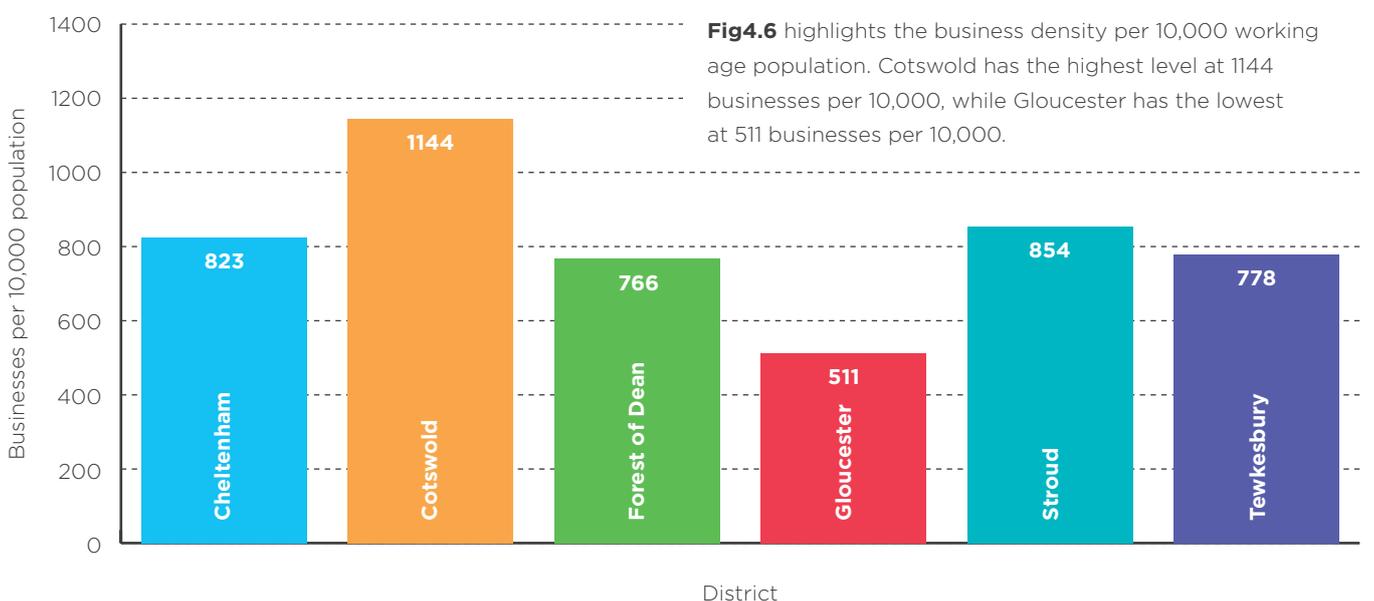
Fig 4.7 **Index of business density per head of population aged 16–64 in Gloucestershire districts relative to England, 2012–17**

Index of business denisty to England average

1.78						1.54
1.27						1.15
1.16						1.04
1.0 England						
0.73						0.69

2012 2013 2014 2015 2016 2017

Year

Legend:
- Cheltenham
- Cotswold
- Forest of Dean
- Gloucester
- Stroud
- Tewkesbury
- England

Fig4.7 indexes the number of businesses per head against the level for England over the period 2012 to 2017. In the period all districts have seen a fall in the relative index against the national level, although (with the exception of Gloucester) they have higher business densities per head than the England average.

Start-up and Survival Rates in Gloucestershire

Fig 4.8 Business starts per 10,000 head of working age (16–64) population, 2017

Fig4.8 shows that only Cotswold district has kept pace with (and exceeded) the national level of business formation per head. Gloucester has the lowest level of business starts. As the location with the highest number of students and younger workers, this suggests there may be a need to further support entrepreneurialism, skills and talent retention.

Fig 4.9 Five-year business survival rates, 2012–17
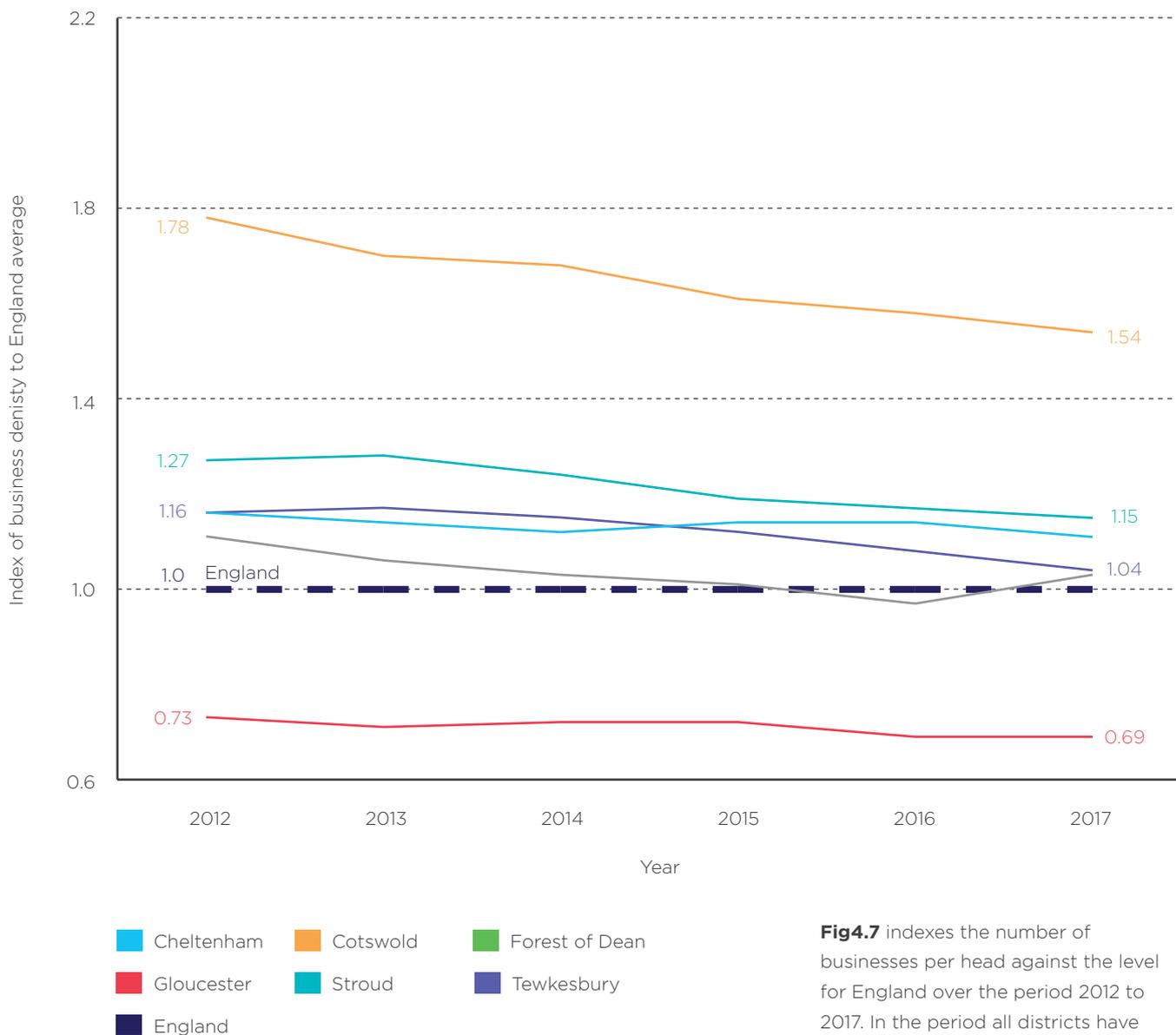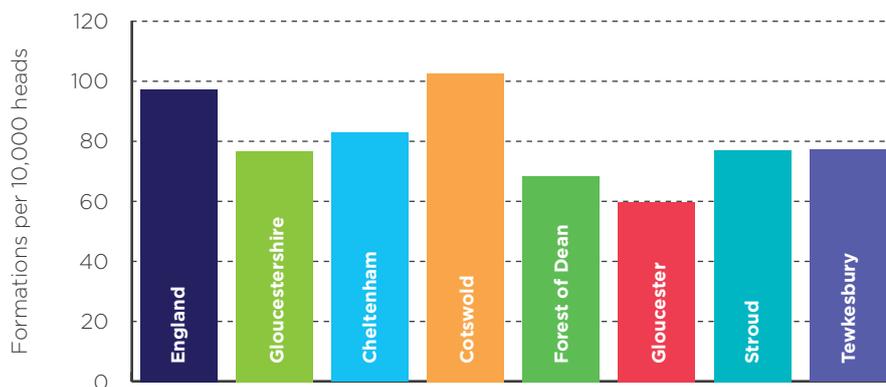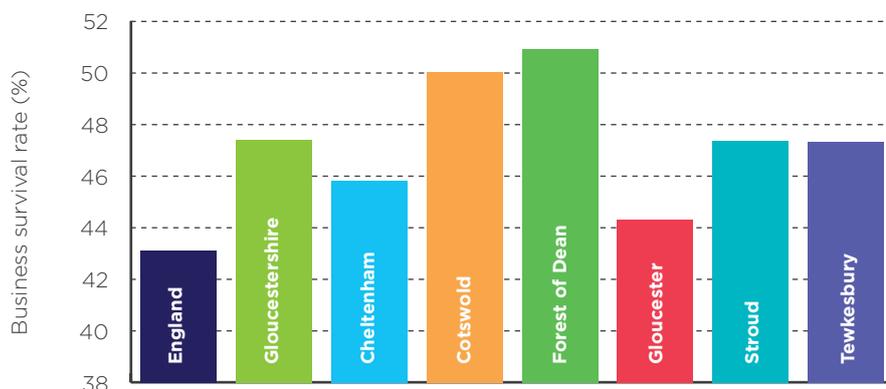

Fig4.9 shows business survival rates for the first five years of existence, for businesses formed in 2012. This shows that the Forest of Dean and Cotswold have the highest proportion of business survivals, with these two districts being the only ones to have a survival rate of 50% or more. Gloucester has had the fewest business survivals, at 44.3% surviving. However, the average five-year survival rates for all districts, and for Gloucestershire, are higher than the average business survival rate for England (43.1%).

Fig 4.10 One-year business survival rates, 2016–17
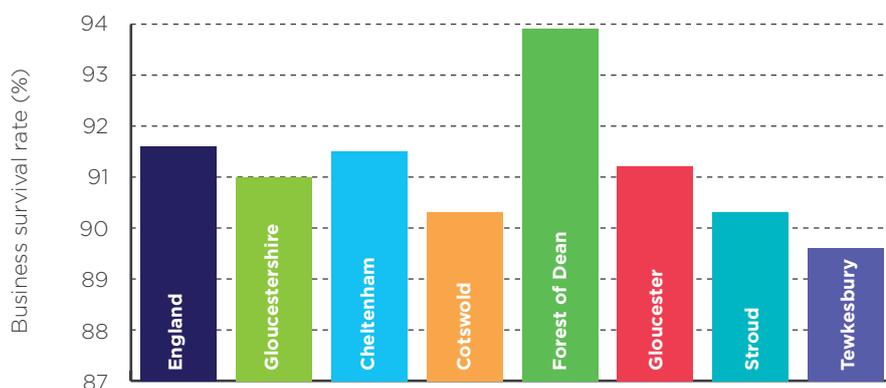
Fig4.10 shows that more than 90% of new Gloucestershire businesses survived their first year, with only Tewkesbury having a business survival rate below 90%. However, the average survival rate for England is 91.6%, higher than the average for Gloucestershire and for every district with the exception of the Forest of Dean, which has a one-year business survival rate of 93.9%.

Business Formation and Decline

Fig 4.11 **Top ten and bottom five sectors driving business formation/decline in Gloucestershire, 2012–17 and 2017–18**

Fig4.11 lends a key insight into the trends in sector formation over the period 2012 to 2017, and also 2017 to 2018. Management Consultancy, Computer Consultancy and 'Other business support not elsewhere classified' have driven positive formation, while 'Other retail' (not in shops) 'Non-specialised wholesale' and 'Other personal services' have declined, alongside 'Securities and commodities trading' and 'Other IT services'.
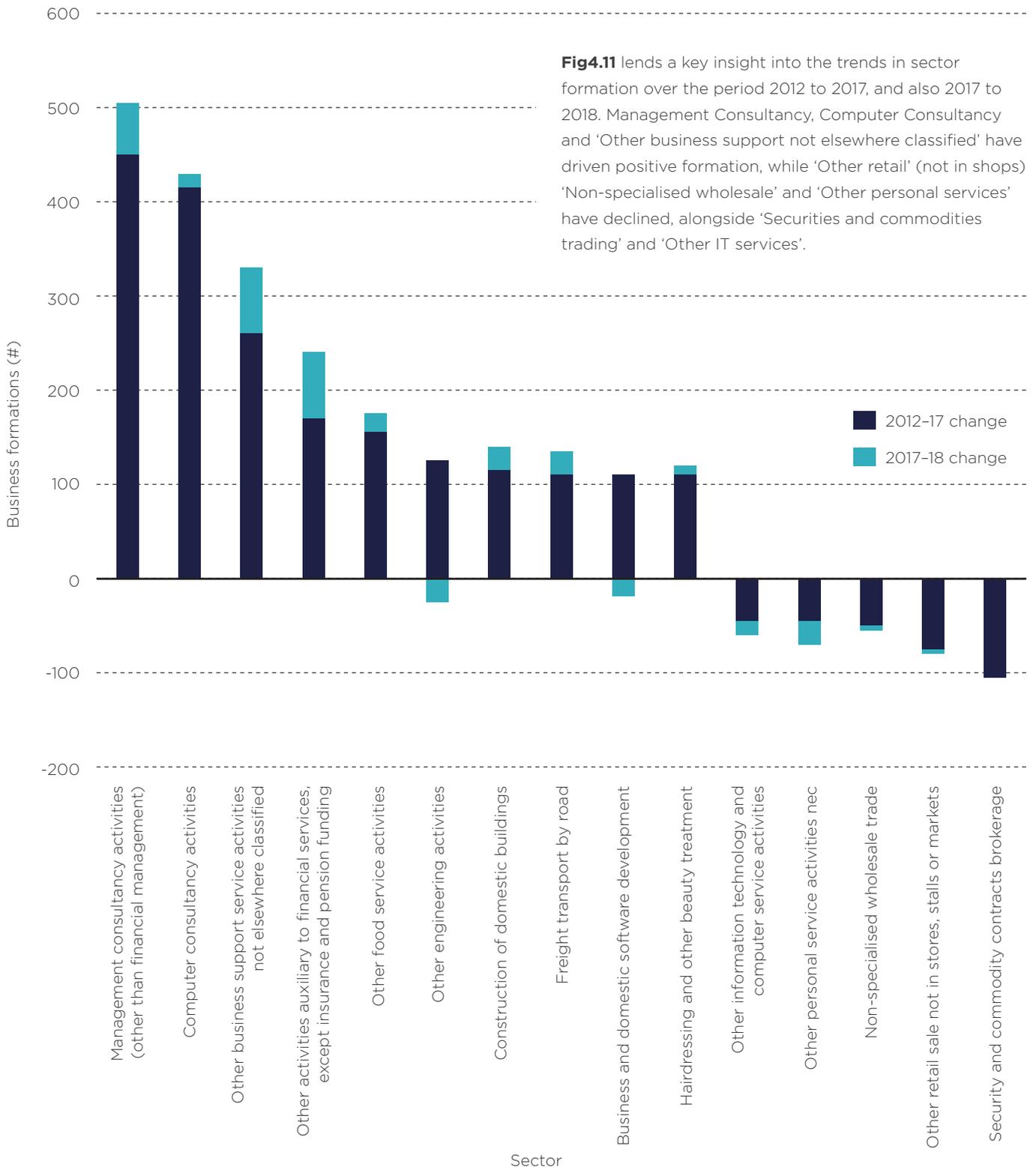
Legend:
- 2012–17 change
- 2017–18 change

Y-axis: Business formations (#)

X-axis (Sector):
- Management consultancy activities (other than financial management)
- Computer consultancy activities
- Other business support service activities not elsewhere classified
- Other activities auxiliary to financial services, except insurance and pension funding
- Other food service activities
- Other engineering activities
- Construction of domestic buildings
- Freight transport by road
- Business and domestic software development
- Hairdressing and other beauty treatment
- Other information technology and computer service activities
- Other personal service activities nec
- Non-specialised wholesale trade
- Other retail sale not in stores, stalls or markets
- Security and commodity contracts brokerage

Gloucestershire Employees and Employment Demand by Sector

Between 2015 and 2017 the total number of local employees increased by 1,000 from 285,000 to 286,000. At 0.4% employee growth over two years was below the South West regional growth of 1.7% and the national growth of 3.1% in the period. The low total has been driven by performance in Cheltenham (-7.6% driven by large falls in 'Defence' and 'Other business support services not elsewhere classified') and Gloucester (0% growth). The Forest of Dean has expanded employee demand by 2.1%, while Tewkesbury and Stroud have grown by 3.4% and 4.2% respectively.

Fig 4.12 **Employee demand in Gloucestershire by major sector, and change, 2015–17**
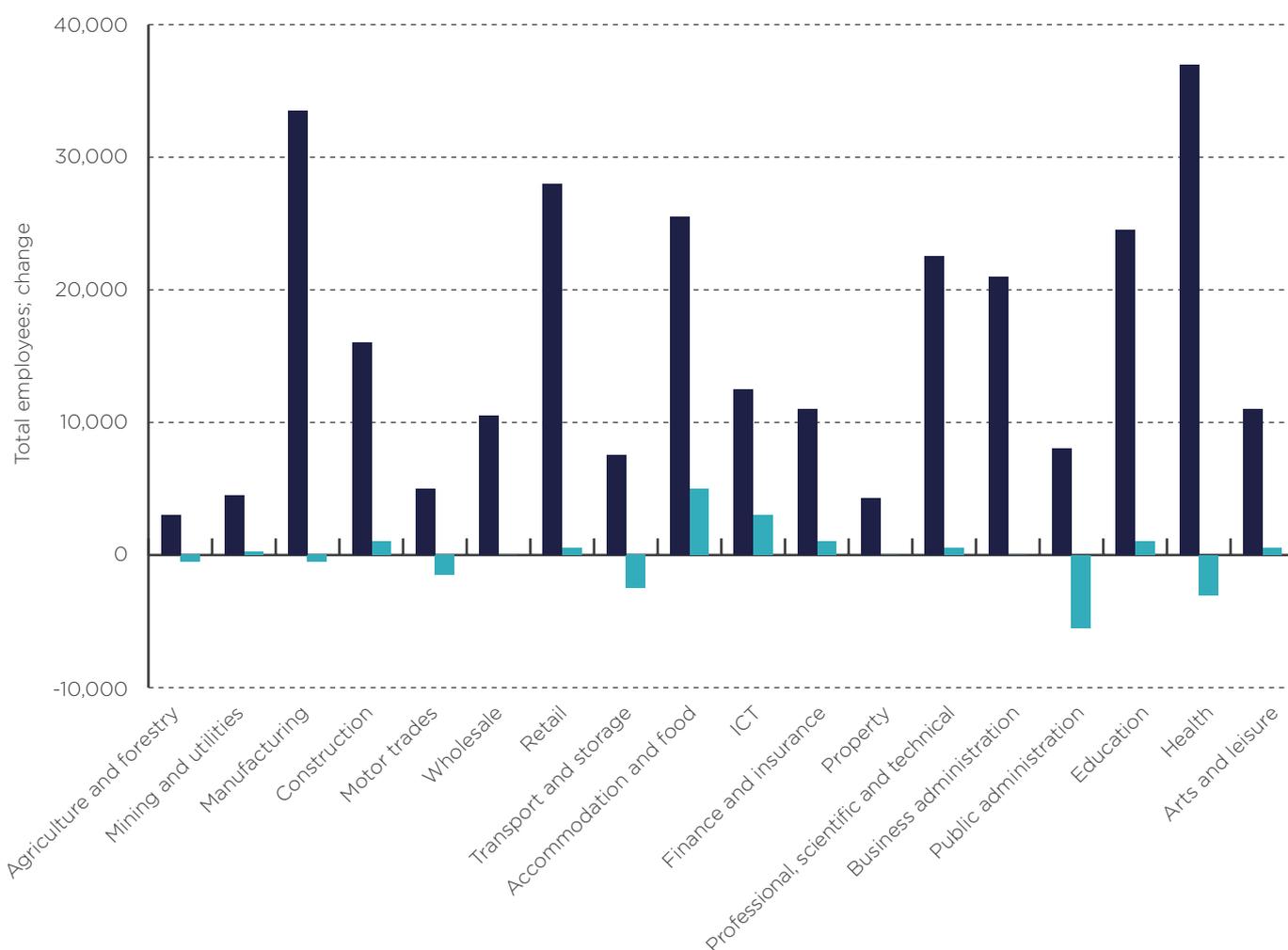
Total local employees 2017

Employee demand change 2015–17

Fig4.12 shows the balance of employee demand across major sectors in 2017, with growth driven by Accommodation and food and ICT offset to some extent by falls in Public administration (in this case primarily 'Defence'), Health and Transport sectors. The proportion of employees in Manufacturing is significantly higher than nationally.

Fig 4.13 Top ten Gloucestershire employee growth sub-sectors –
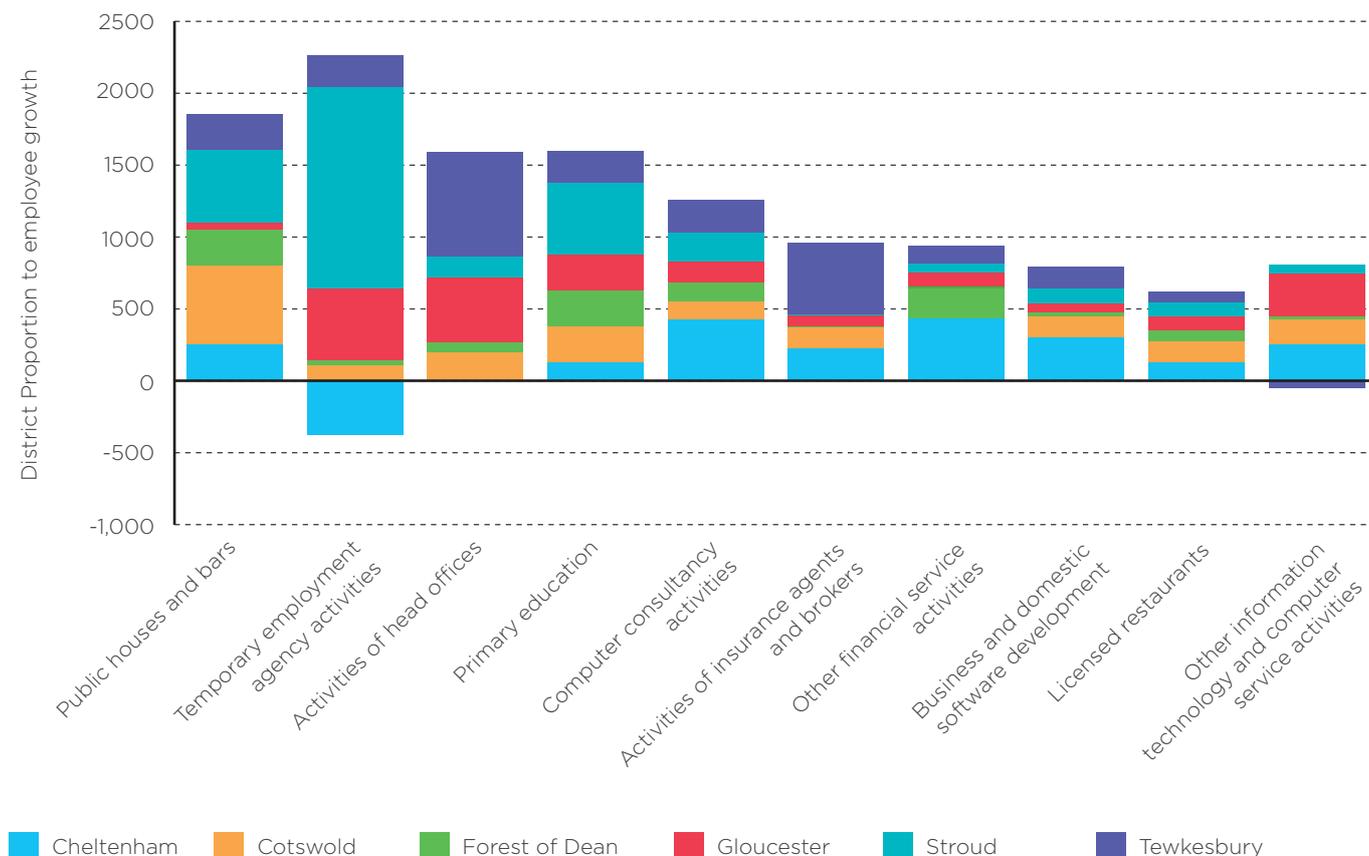district contributions to growth, 2015–17

Fig4.13 focusses on the top ten sub-sectors contributing the most to local employee demand growth between 2015 and 2017, also showing in which districts growth has occurred. Public Houses and bars have added the highest net total (+2,050) primarily in Cotswold and Stroud. Licensed restaurants, and, outside of the top ten, several further complementary growth sectors, suggest a thriving and growing tourism and leisure economy in Gloucestershire. Head offices, insurance agencies and financial services also feature strongly. Computer consultancy, business and domestic software and other ICT activities are, alongside these other sectors likely to be contributing strongly to the demand for temporary employment agency services. This suggests that there may be particular recruitment challenges for these more highly skilled sectors that may be likely to rely on agencies where they are outside of larger urban skills networks and reserve pools of graduate skills.

Fig 4.14 Creative sector employees comparison across Gloucestershire districts, 2017
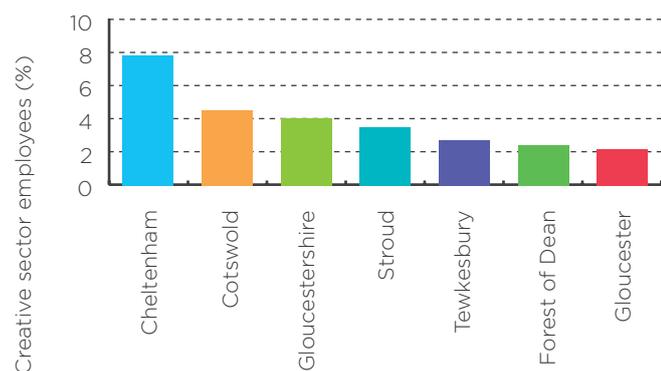
Fig4.14 highlights the scale of the Department for Digital, Culture, Media and Sport (DCMS) Creative Industries clustering in Gloucestershire. Cheltenham (the largest district labour market) also has a very high percentage of Creative Employment. Notable cluster specialisms (not shown in the graph) in Cheltenham include book publishing, specialised design, and computer programming and consultancy. Cotswold also has strong specialisms in architecture and specialised design. The presence of DCMS sectors has been shown to have a strong direct effect on skills clustering and retention, which, in the medium term, also drives the formation of higher value business sectors. Combined with strong rural tourism and leisure sectors, the area has strong place assets to build on.

Job Vacancy Trends and Skills Shortage Vacancies in Gloucestershire

This information is based on data derived from the UK Employer Skills Survey 2017.

Fig4.15 shows that Gloucestershire has a higher incidence of firms reporting vacancies than nationally and regionally, with 28% of firms reporting at least one vacancy compared to 20% nationally and 21% regionally.

Fig 4.15 Incidence of firms reporting vacancies, 2017

% of firms in sample

28% Gloucestershire   21% South West   20% England

Fig4.16 shows that when vacancies are expressed as a percentage of total employment, Gloucestershire is a little above the regional and national averages.

Fig 4.16 Density of vacancies, 2017

Firms in sample (%)

Gloucestershire	South West	England
4%	3.7%	3.6%
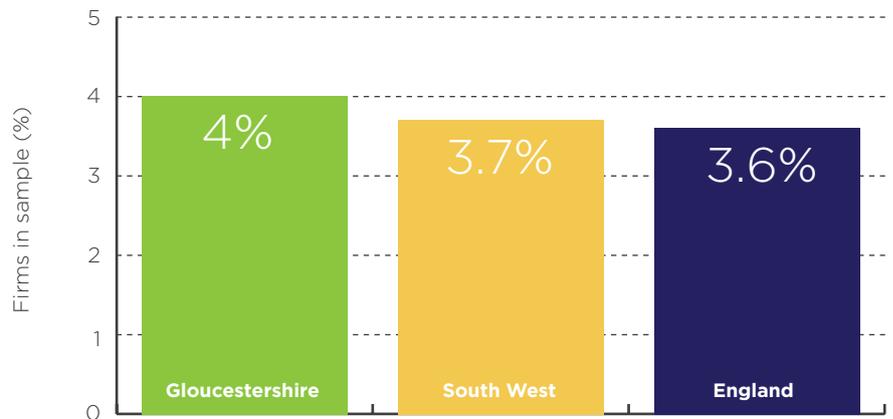
Fig4.17 shows 43% of vacancies in Gloucestershire were classed as Hard to Fill, this was in line with the regional average but higher than the national average of 33%. The percentage of skills shortage vacancies was lower than the regional average but higher than the national average.

- Gloucestershire
- South West
- England

Fig 4.17 Hard to fill and Skill shortage vacancies as a percentage of vacancies, 2017
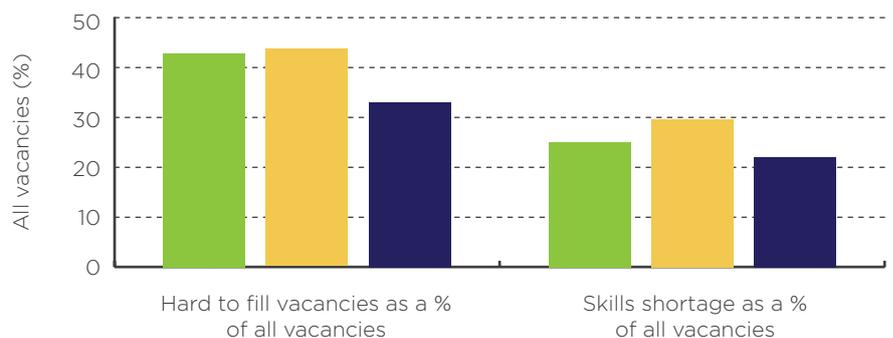
All vacancies (%)

Hard to fill vacancies as a % of all vacancies   Skills shortage as a % of all vacancies

Vacancy Analysis by Sector within Gloucestershire

This information is based on data derived from the UK Employer Skills Survey 2017.

Fig 4.18 **Vacancies compared to share of occupational groups, 2017**

Legend: SOC 1-3, SOC 4-5, SOC 6-9
Standard Occupational Classification (SOC) 2010

Y-axis: Vacancies/employment (%)

Categories: % of employment / % of vacancies for Gloucestershire, South West, England

Fig4.18 shows that the occupations where vacancies are concentrated largely reflect Gloucestershire's occupational structure. This differs somewhat from the picture seen across the South West, where vacancies are under-represented in the higher skilled occupations and over-represented amongst the lower skilled occupations.

Fig 4.19 **Skills shortage vacancies by sector in Gloucestershire, 2017**

9% Primary sector and utilities

39% Manufacturing

22% Construction

16% Trade, accomodation and transport

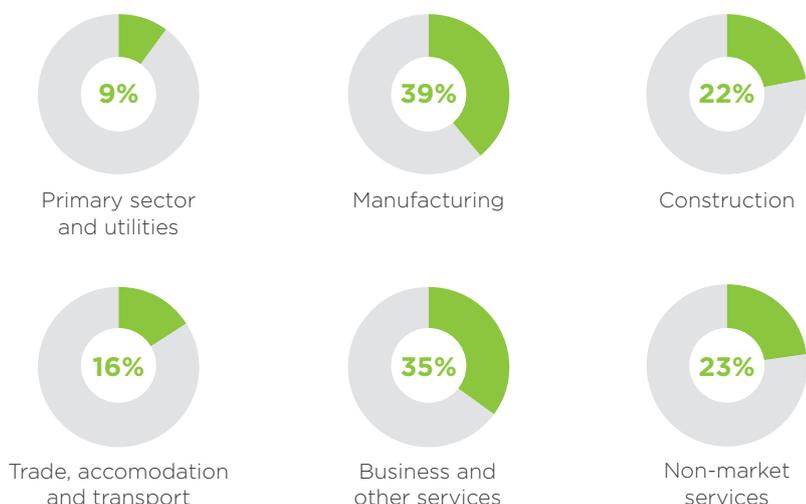35% Business and other services

23% Non-market services

Fig4.19 looks at the percentage of vacancies that are skills shortage vacancies for 6 broad sectors. It shows that the 'Manufacturing' and 'Business and other services' sectors have the highest proportion of skills shortage vacancies, suggesting this is an area to focus on in the future.

Dynamic Trend Analysis of Business and Employee Performance

Between 2010 and 2017/18 both the number of businesses and the number of people employed have seen net growth in Gloucestershire (+4,465, +15% and +17,000, +6% respectively).

However, the performance has been far from uniform between sectors of industry. Using a quadrant analysis as shown below, sectors have been classified into one of four typologies **(Decline, Fragmentation, Consolidation and Growth).**
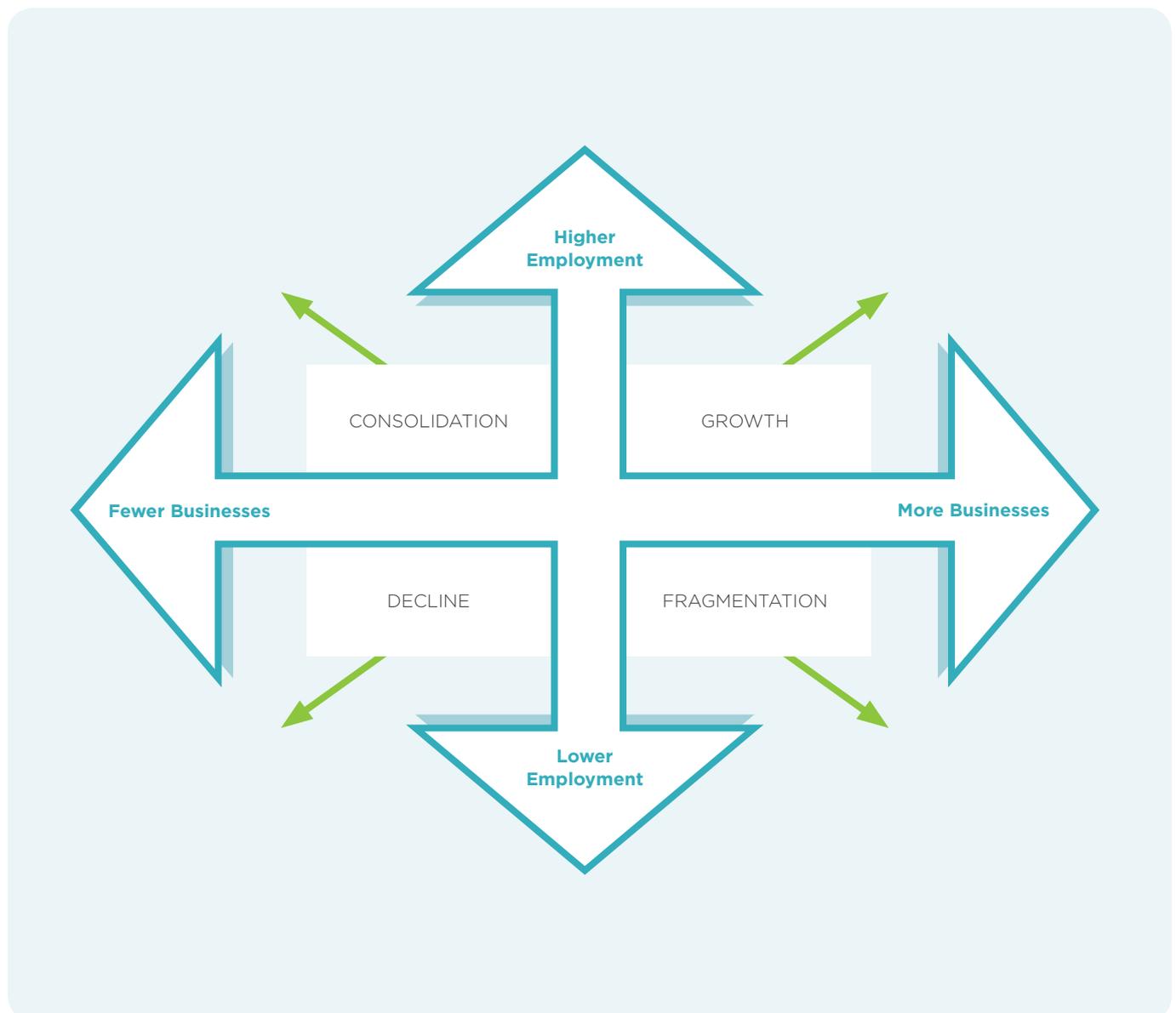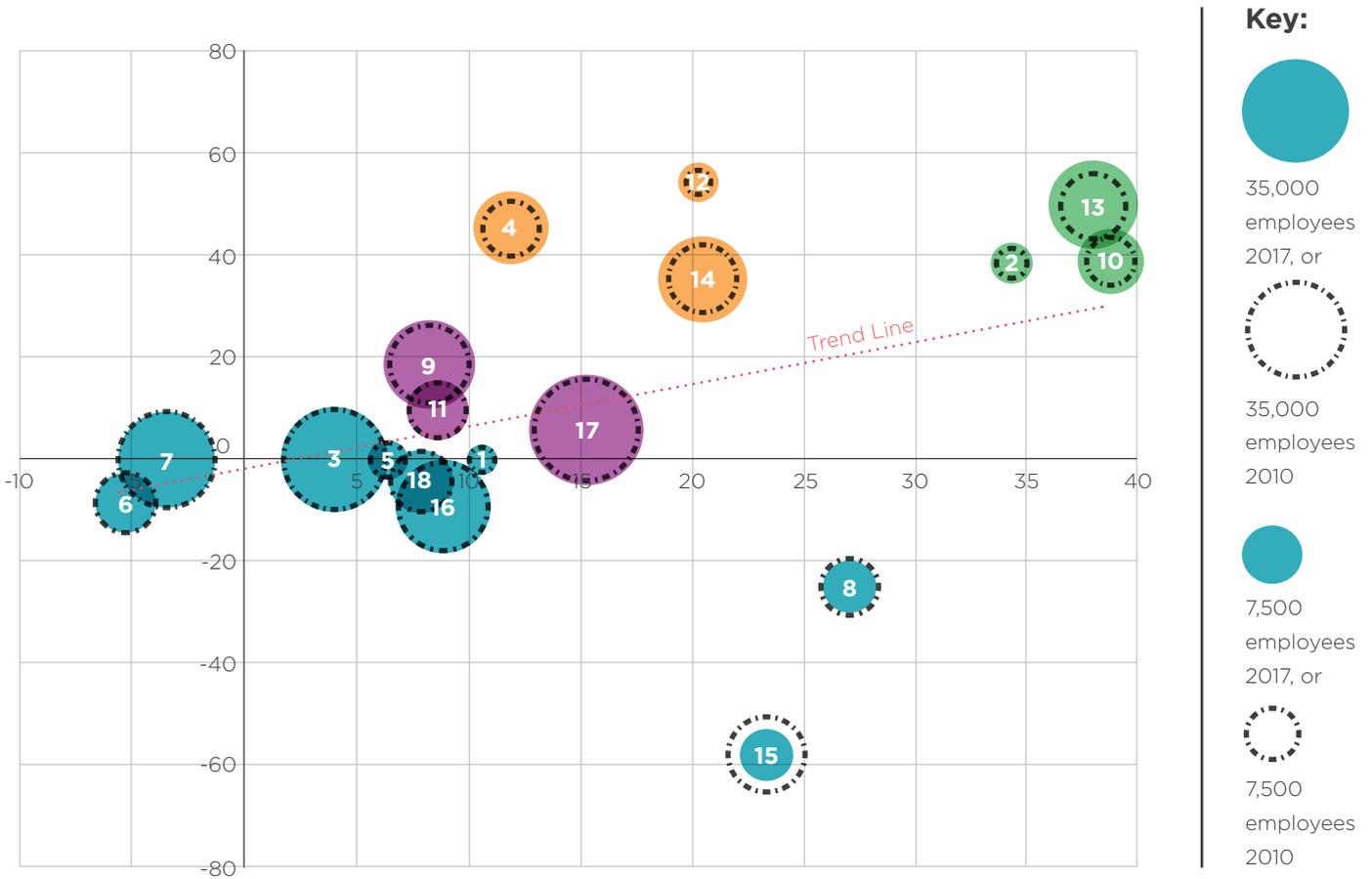
Higher Employment

CONSOLIDATION

GROWTH

Fewer Businesses

More Businesses

DECLINE

FRAGMENTATION

Lower Employment

Fig 4.20 Business formation (x-axis) and employee growth (y-axis) dynamics in Gloucestershire, 2010–17/18

Key:

35,000 employees 2017, or

35,000 employees 2010

7,500 employees 2017, or

7,500 employees 2010

1. Agriculture, forestry and fishing
2. Mining, quarrying and utilities
3. Manufacturing
4. Construction
5. Motor trades
6. Wholesale
7. Retail
8. Transport and storage
9. Accommodation and food services
10. ICT
11. Financial and insurance
12. Property
13. Professional, scientific and technical
14. Business administration and support services
15. Public administration and defence
16. Education
17. Health
18. Arts, entertainment, recreation and other services

The quadrants of **Fig4.20** show the rate and direction of travel for sectors, while the circle sizes denote total employees. Overall, the trendline shows that the Gloucestershire dynamic is one of growth. More interestingly, three relatively distinct growth groups are visible.

Growth group 1 includes three sectors and can be characterised as having significant additional business formation and start-up activity over the period relative to the next growth grouping. Group 1 includes: i) Professional scientific and technical; ii) Mining and Utilities; and iii) ICT.

Growth group 2 includes a further three sectors that have comparable levels of employee growth, but lower levels of business formation: i) Construction; ii) Property; and iii) Business Administration.

Growth group 3 includes Accommodation and food services, Finance and insurance and Health. These are more established sectors and tended to be larger in 2010 relative to the first two growth groups.

Six of 18 sectors appear as fragmenting: four of these are grouped close to the x axis i) Manufacturing; ii) Motor trades; iii) Arts, entertainment and leisure; and, iv) Education. Two others have displayed a more concerted pattern of fragmentation (v) Transport and storage and vi) Public administration and defence. In the latter case we understand that it is Defence that has driven this fall.

Two remaining sectors are marginally declining: Retail and Wholesale.

Services Exports from Gloucestershire

Services exports from the NUTS 2[14] area (which includes Gloucestershire) totalled £7,609m in 2017. Nationally, services exports comprise 48.2% of total exports (and goods exports 51.8%) but in the South West region services exports comprise just 35.6%, showing that the region as a whole has a relative advantage in goods exports, comprising 64.4%.

Fig 4.21 Total Value of services exports from the NUTS 2 area containing Gloucestershire also includes Bristol; Bath and North East Somerset; Swindon and Wiltshire, 2017
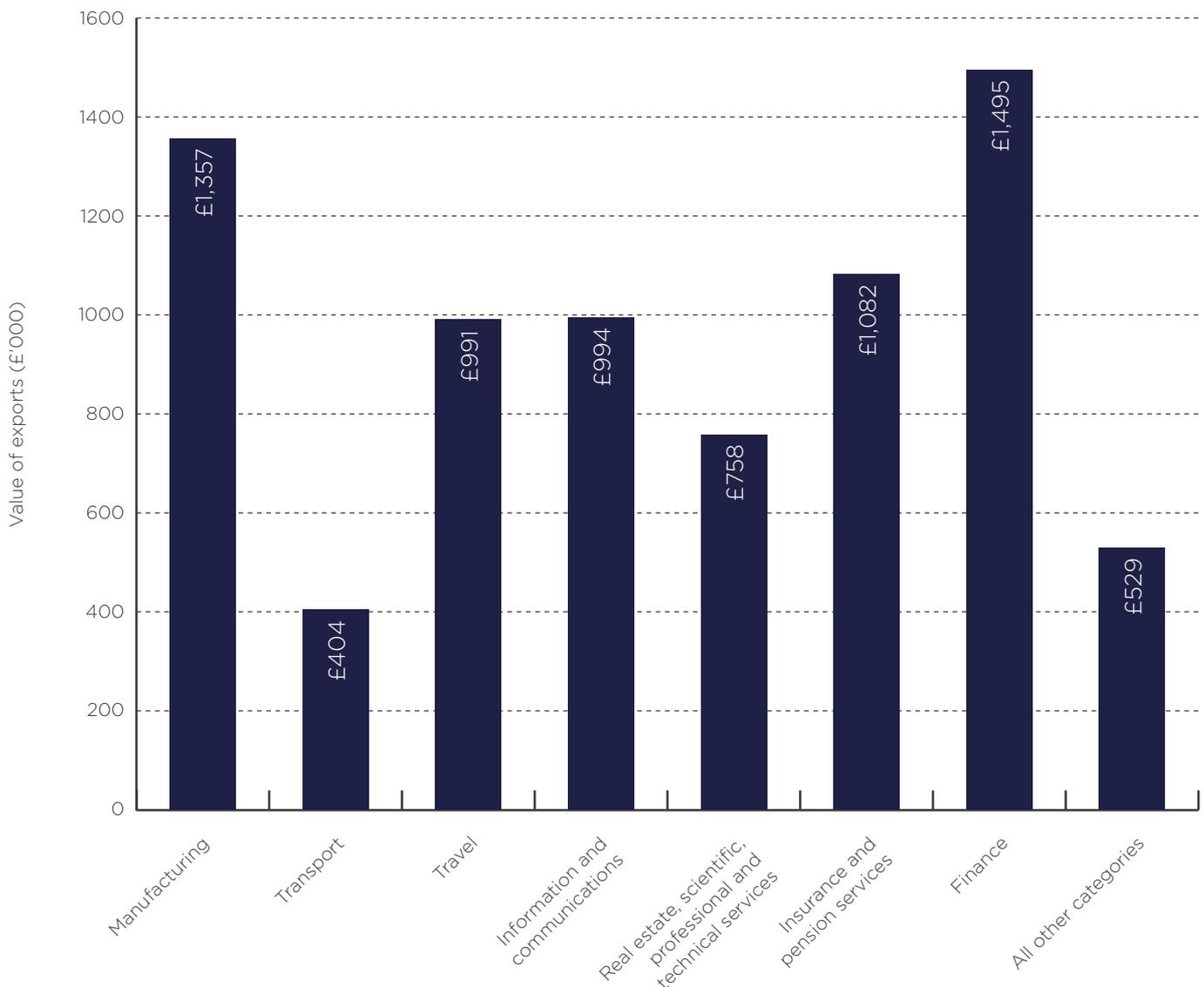
Fig4.21 shows the individual sector contributions to the overall services export total of £7,609m.

---

14   EU Regional Classification: Nomenclature of Territorial Units for Statistics (NUTS 2)

Fig 4.22 Comparing the balance of services exports incomes across NUTS 2 areas, 2017
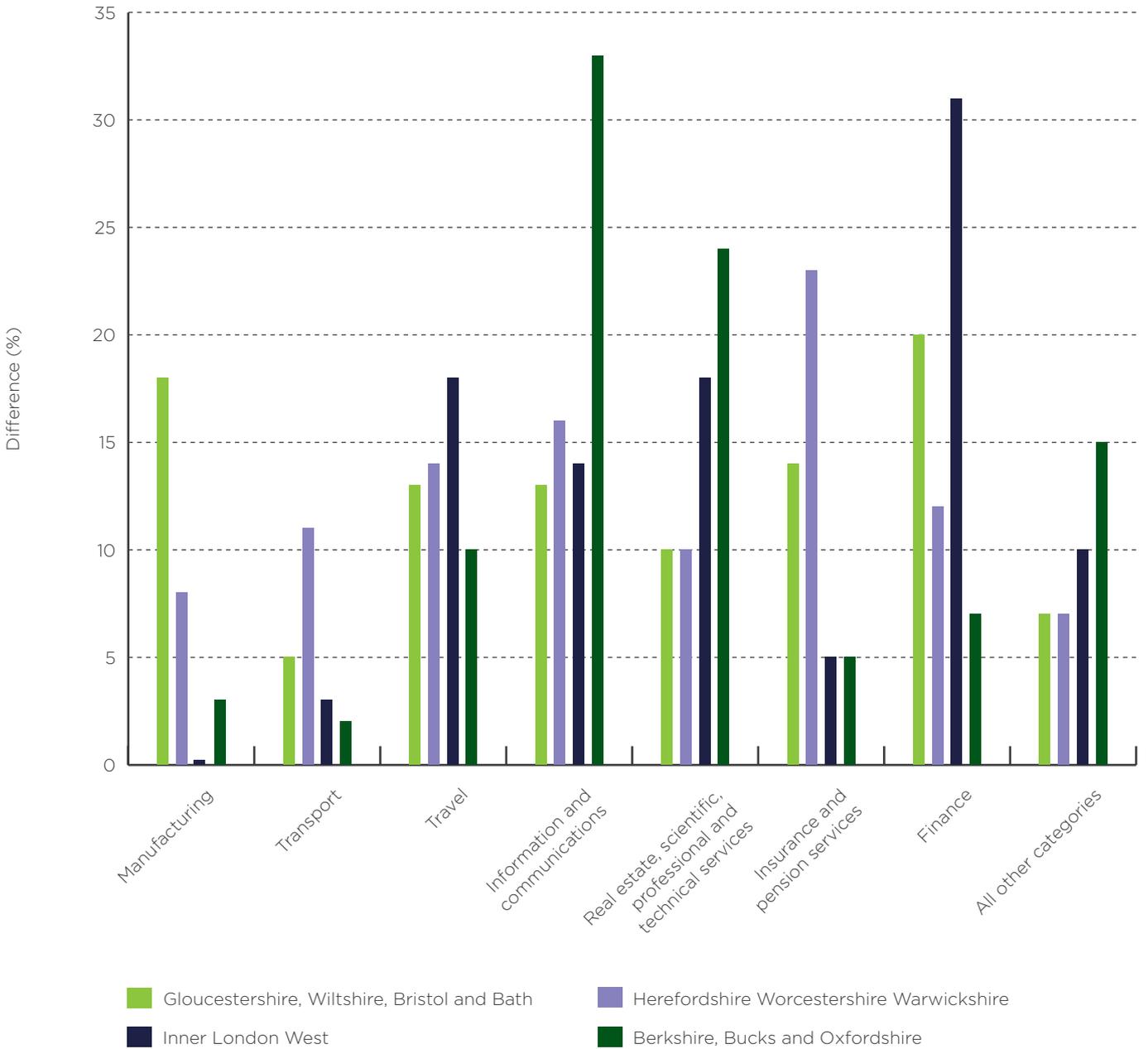
Fig4.22 compares the balance of sector exports coming from the NUTS 2 region to three other locations.

- The NUTS 2 region has significantly higher shares of Manufacturing services exports than all comparators.
- Finance comprises the highest total share of exports, representing an important high-value cluster in the region.

Value of Exports
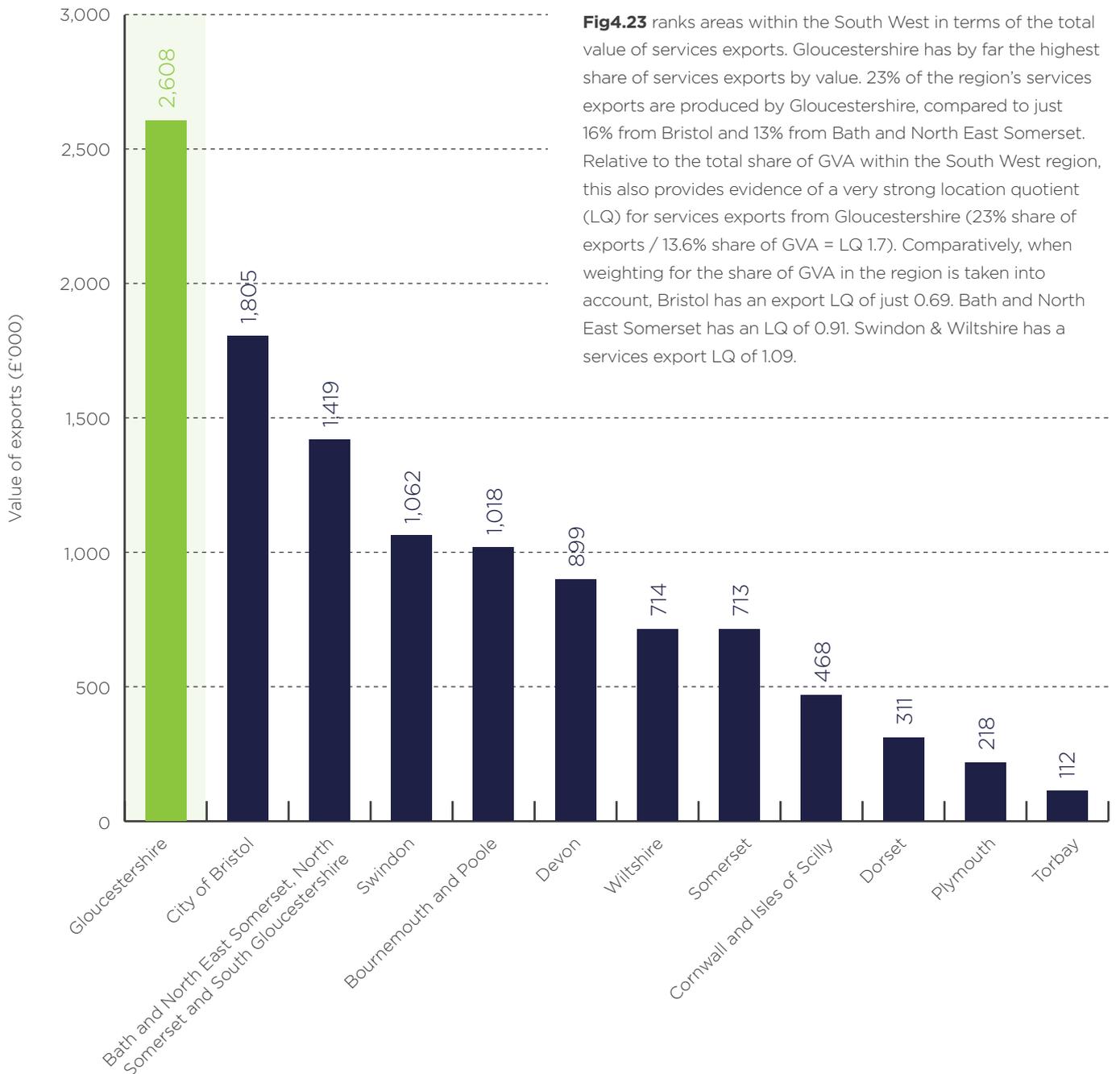
Fig4.23 ranks areas within the South West in terms of the total value of services exports. Gloucestershire has by far the highest share of services exports by value. 23% of the region's services exports are produced by Gloucestershire, compared to just 16% from Bristol and 13% from Bath and North East Somerset. Relative to the total share of GVA within the South West region, this also provides evidence of a very strong location quotient (LQ) for services exports from Gloucestershire (23% share of exports / 13.6% share of GVA = LQ 1.7). Comparatively, when weighting for the share of GVA in the region is taken into account, Bristol has an export LQ of just 0.69. Bath and North East Somerset has an LQ of 0.91. Swindon & Wiltshire has a services export LQ of 1.09.

Relative to Great Britain, the South West region has a service exports LQ of 0.62. In contrast, Gloucestershire could be said to have a marginal comparative advantage in services exports compared to the national level, with an LQ of 1.05. The NUTS 2 region as a whole, in which Gloucestershire is the dominant exporter, has a particularly notable Manufacturing Services LQ of 2.63. These findings point towards aspects of Gloucestershire's 'comparative advantage'.

Location quotient (LQ) is a valuable way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation.
It can reveal what makes a particular region "unique" in comparison to the national average.

In more exact terms, location quotient is a ratio that compares a region to a larger reference region according to some characteristic or asset. Suppose X is the amount of some asset in a region (e.g., manufacturing jobs), and Y is the total amount of assets of comparable types in the region (e.g., all jobs). X/Y is then the regional "concentration" of that asset in the region. If X' and Y' are similar data points for some larger reference region (like a state or nation), then the LQ or relative concentration of that asset in the region compared to the nation is (X/Y) / (X'/Y').

For example:

$$LQ = \cfrac{\left(\cfrac{\text{Regional Industry Employment}}{\text{Regional Total Employment}}\right)}{\left(\cfrac{\text{State Industry Employment}}{\text{State Total Employment}}\right)}$$

Value	Implication
LQ > 1	Area has proportionally more workers employed in a specific industry sector than the larger comparison area
LQ ≥ 1.25	Area industry has potential to be classified as exporter
LQ < 1	May indicate opportunity to develop businesses in the local area

Source: https://www.economicmodeling.com/2011/10/14/understanding-location-quotient-2/

Place

Place Summary

1. Gloucestershire is a largely rural county, with two major urban areas, Gloucester and Cheltenham. Being largely rural, the county has a number of market towns, which are attractive tourism destinations, and is also home of parts of several Areas of Outstanding Natural Beauty (AONB) including the world-renowned Cotswold AONB. The county is also located in an advantageous position between Cardiff, Birmingham, Oxford, London, and Bristol, which offers significant benefits to exploit supply chain development and attract talent.

2. The natural assets within Gloucestershire, particularly the Cotswold AONB, are significant, but also place constraints on development potential in the area. Similarly, with the agriculture sector, the AONB takes up a considerable amount of land, particularly land just outside the main urban areas of Gloucester and Cheltenham. This reduces the ability to generate increased levels of housing, including the provision of new builds of mixed tenure to support the workforce. This in turn could have an effect on young people moving to the area.

3. However, the natural assets are also beneficial to Gloucestershire. Gloucestershire has a strong tourism industry, with around 16% of the total workforce in Gloucestershire employed in the sector, driven in no small part by the county's natural assets. Currently the largest sector of employment related to tourism is Food, followed by Clubs and Pubs. Over the period of 2015 to 2017, all sectors of the tourism industry in Gloucestershire grew.

4. There are some areas of high deprivation within Gloucestershire, many of which are located in the major urban hubs within the county, although pockets of high deprivation exist outside of these areas. Deprivation can have an impact on productivity, as well as related impacts on health and wellbeing. As such, action may be needed to tackle deprivation within the county.

5. Gloucestershire has a relatively self-contained labour market in terms of commuting, but there is some commuting outside of the county. Commuting destinations are mainly to nearby areas just outside Gloucestershire, with a large number commuting to areas such as Bristol, Swindon and South Gloucestershire. While there is naturally going to be some out-commuting to areas such as Bristol, which offer opportunities that the less urbanised Gloucestershire does not, there are opportunities to reduce some of this outflow by offering more employment opportunities locally. Delivering opportunities such as 'Cyber Central' – the major planned cyber business park in Cheltenham – may go some way to doing this.

6. Despite the out-commuting from the county, there are a number of nationally and internationally significant assets within Gloucestershire which act as a draw to the area. These assets include GCHQ, Gloucestershire Airport and its aviation cluster, the agri-food sector, and a range of significant high value technical and engineering companies. Each plays an important role in developing Gloucestershire's competitive advantage. The burgeoning Central Gloucestershire 'City Region' area – primarily Cheltenham, Gloucester and parts of Tewkesbury Borough – as a thriving urban heart for the county, with high quality employment, significant housing growth and continually improving physical and digital connectivity, has the potential to further promote Gloucestershire as an attractive place for people to live and work.

Rural Productivity and Agriculture in Gloucestershire

29% of the Gloucestershire population live in rural areas compared to 17% nationally. The area therefore has a 70% higher rural population than average.

Fig 5.1 Productivity and earnings relative to Local Authorities with similar urban/rural designations, 2018

Fig5.1 illustrates Department for Environment, Food and Rural Affairs (Defra) figures comparing the productivity of Local Authority areas with comparator areas with similar urban/rural splits. This shows that in Gloucestershire strong productivity is not – as may sometimes be the perception – confined to urban areas. Strong GVA performance in Tewkesbury may be explained by the presence of specialist manufacturing there (e.g. for aviation). In the case of Cotswold, it may be related in part to higher value tourism services that bring significant income derived from local AONB status.

Food manufacturing is the UK's largest manufacturing sector and the agricultural sector in Gloucestershire is anchored by several large companies that help integrate the production, manufacturing and distribution supply chains in the area, making it a setting for significant innovation across the supply chain.

Fig 5.2 Gross Value Added from Gloucestershire's farm-to-table agriculture supply chain, 2018
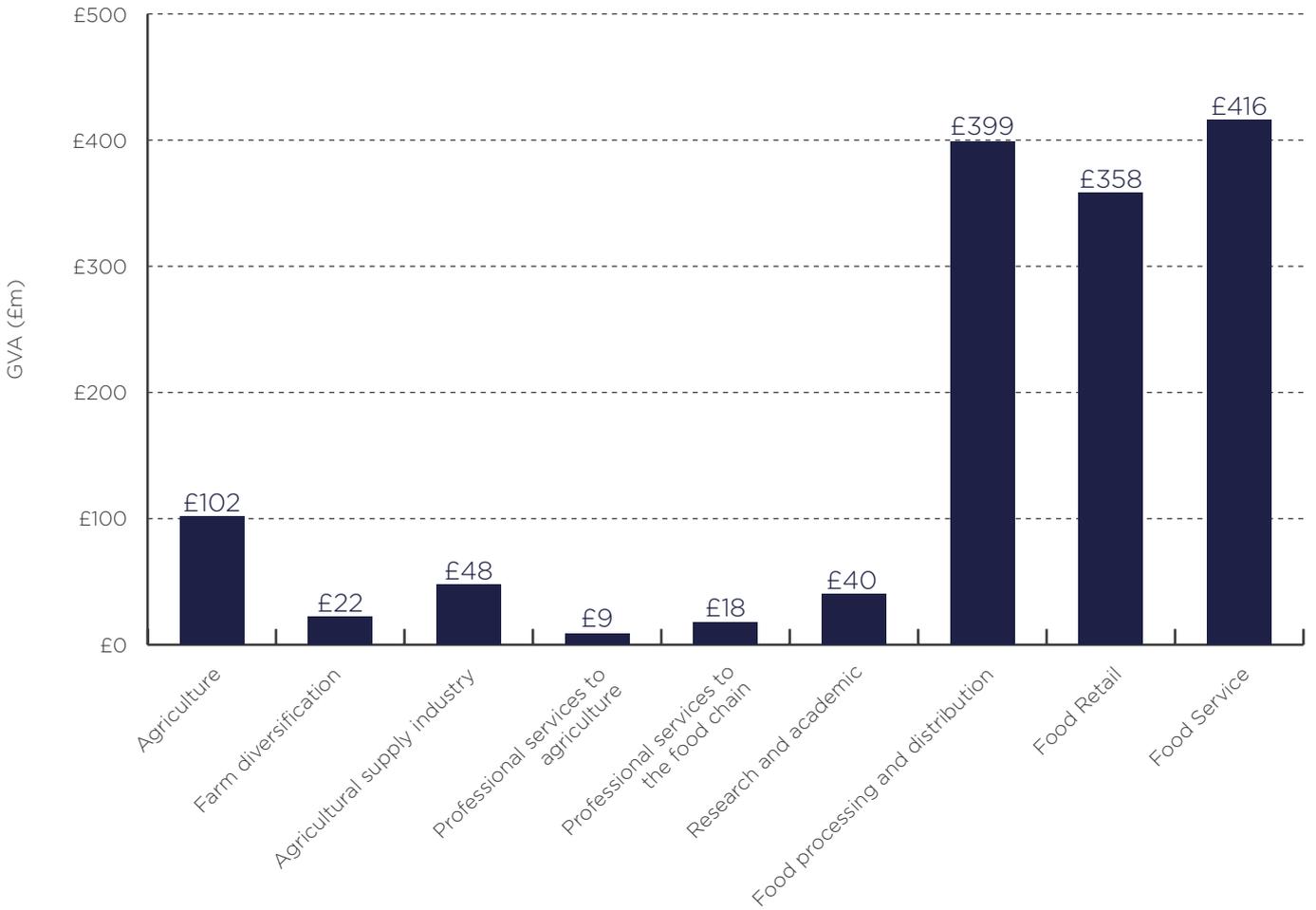

Fig5.2 shows the GVA at all stages of the supply chain for agriculture in Gloucestershire in 2018. Smaller sectors within the total of £1.4bn GVA highlight that while direct GVA from the sector is low at the pre-processing stage, these elements of agriculture support significant downstream value chains in the county. 'Farm diversification' is not significant in terms of the GVA totals in **Fig5.2**, but **Fig5.3** highlights that non-agricultural activities are significant and are driving diversification activities.

According to Defra, AONBs (such as the Cotswold AONB) tend to see the highest rates of diversification. This, coupled with higher levels of home working in Cotswold district (see Fig5.4) may offer future potential in this area for alternative types of employment land. This may be in demand by new economy sectors and offer potential for spill-overs through co-location.

The value of natural capital provided by the AONB and other parts of Gloucestershire – for example in terms of carbon sequestering, renewable energy generation, health and well-being benefits and more – merits further investigation, as the methodologies for such valuations develop and mature.

Fig 5.3 Farm diversification trends in England, 2018

Types of diversification	% of farms	Average income
Letting buildings for non-agricultural use	43%	£17,900
Processing or retailing of farm produce	9%	£9,700
Sport and recreation	13%	£3,600
Tourism accomodation & catering	6%	£7,000
Solar energy	20%	£2,400
Other renewables	9%	£4,600

Gloucestershire Commuting Choice

As a rural economy, according to the 2011 Census, Gloucestershire has a heavy reliance on cars for commuting, with less reliance on public transport.

Fig 5.4 Method of travel to work by district, 2011 census

Legend:
- Driving a car or van
- Passenger in a car or van
- On foot
- Bicycle
- Bus, minibus or coach
- Train, underground, metro, light rail or tram
- Work mainly at or from home
- All other methods of travel to work

Fig5.4 shows there is a heavy reliance on cars and vans as a primary commuting tool within Gloucestershire. In every district, the number of people commuting by car or van is over 50%, with over two thirds of residents of the Forest of Dean using a car or van (67%). There is a limited number of individuals using other methods of transport, with comparatively more commuting on foot and cycling in Cheltenham and Gloucester than in the more rural districts. There is a higher proportion of individuals working from home in the more rural areas of Cotswold and the Forest of Dean. The limited bus use in the more rural districts is clear, as there is almost no usage for commuting in these places.

Fig 5.5 Commuting distance by district, 2011

Legend:
- 0-5km
- 5-30km
- 30+km

Fig5.5 highlights that people in the two urban districts are more likely to work closer to home, while in Cotswold district the rural character and high skill levels are associated with the furthest average commute for the county.

Fig 5.6 Home working, 2011

Fig 5.6 Home working, 2011 — Bar chart. Y-axis: Proportion of commuters (%), 0 to 14. X-axis: LEP. Gloucestershire ~12.6, Oxfordshire ~12.7, Swindon and Wiltshire ~12.1, West of England ~10.1, Worcestershire ~12.2.
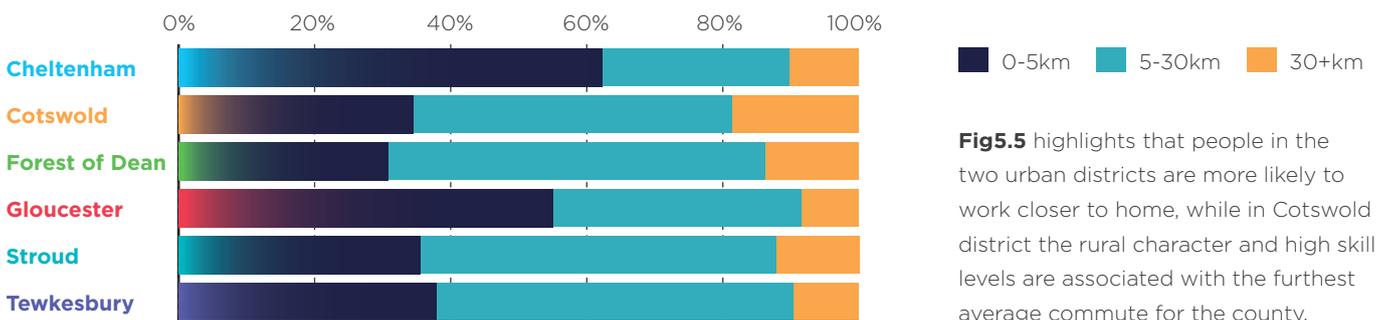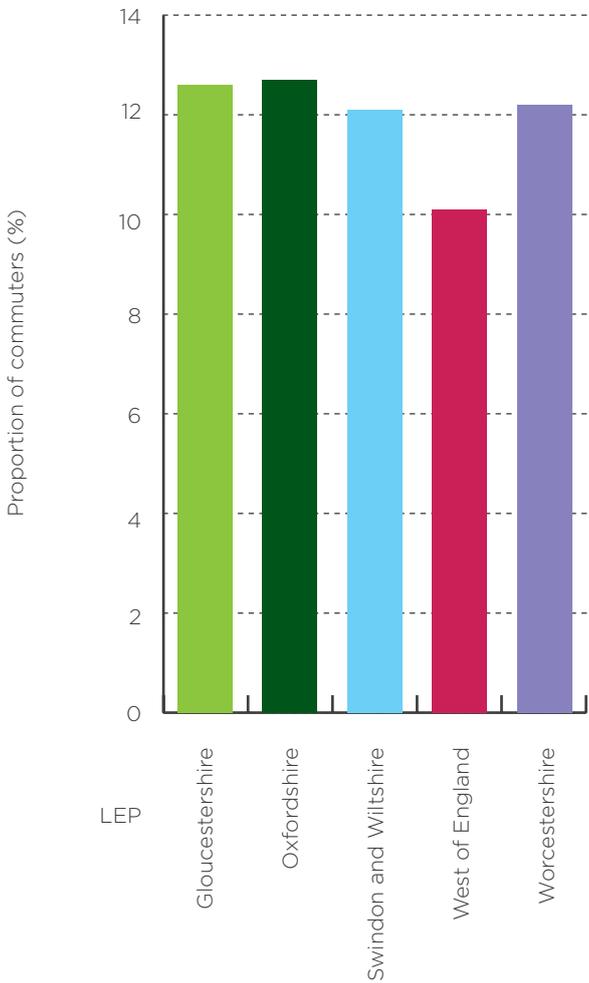
Fig5.6 compares the proportion of people working at home in Gloucestershire to four other LEP areas. Gloucestershire has a higher proportion of individuals working from home than several neighbouring LEP areas, and the South West region (not shown). With a rate of 12.6%, it is marginally higher than Swindon and Wiltshire, and significantly higher than the West of England. This suggests that Gloucestershire has the employment make-up to enable a sub-set of workers to work at home. Working from home usually requires good internet access and flexible jobs.

Fig 5.7 Commuting distance by LEP, 2011

Fig 5.7 Commuting distance by LEP, 2011 — Bar chart. Y-axis: Proportion of commuters (%), 0 to 60. X-axis: LEP. Legend: 0-5 (red), 5-30 (blue), 30+ (green).
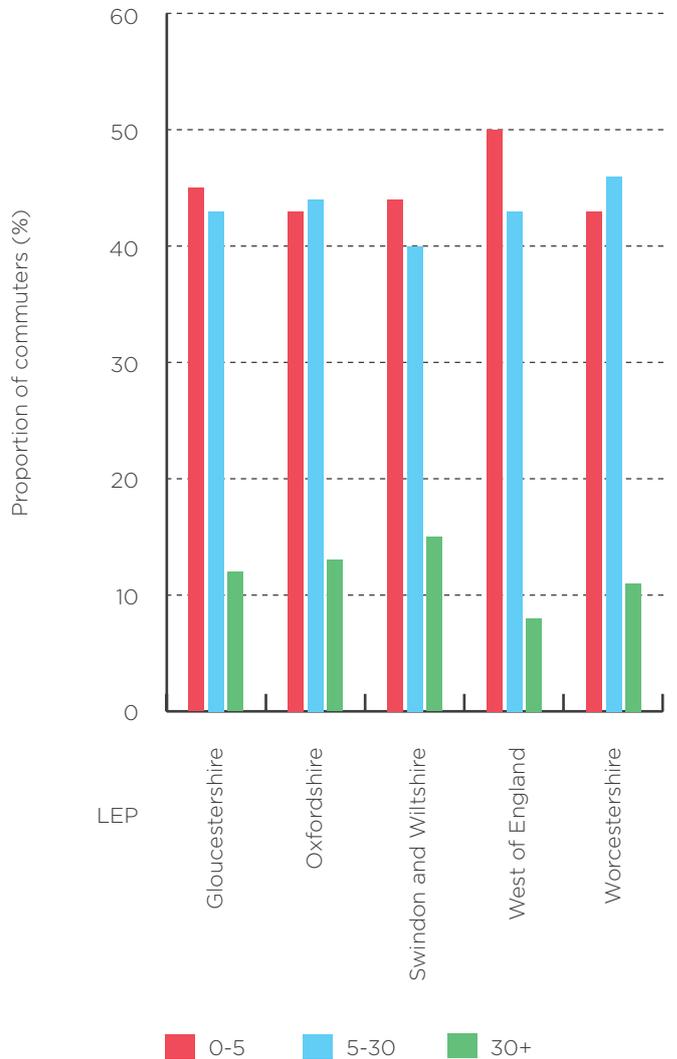
Legend: 0-5, 5-30, 30+

Fig5.7 looks at distance travelled to work. This measure suggests that Gloucestershire residents travel a similar distance to work as residents of nearby LEP areas, except for the West of England. This can be explained by the more rural make-up of Gloucestershire compared to the West of England, which contains the City of Bristol.

Commuting in Gloucestershire

The 2011 Census shows that 239,603 Gloucestershire residents commuted on the day of the Census. Of these commuters, 199,735 or 83.4% went to a workplace within Gloucestershire.

Fig5.8 shows the levels of self-containment within Gloucestershire and its districts.

The level of self-containment of the labour market is high, and especially so in the Forest of Dean. Self-containment is lowest in the three most closely bounded urban districts of Gloucestershire, due to strong internal cross-commuting between these locations.

Fig 5.8 Proportion of residents working within Gloucestershire and district labour markets, 2011
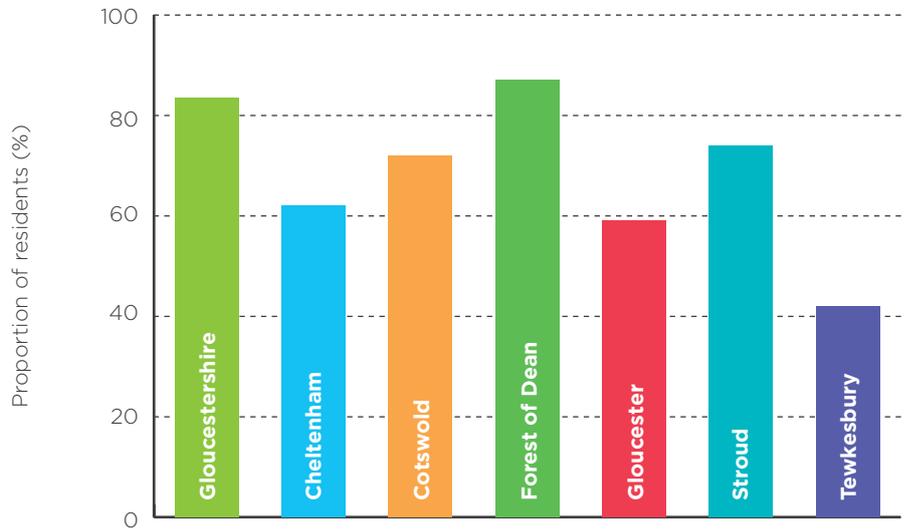

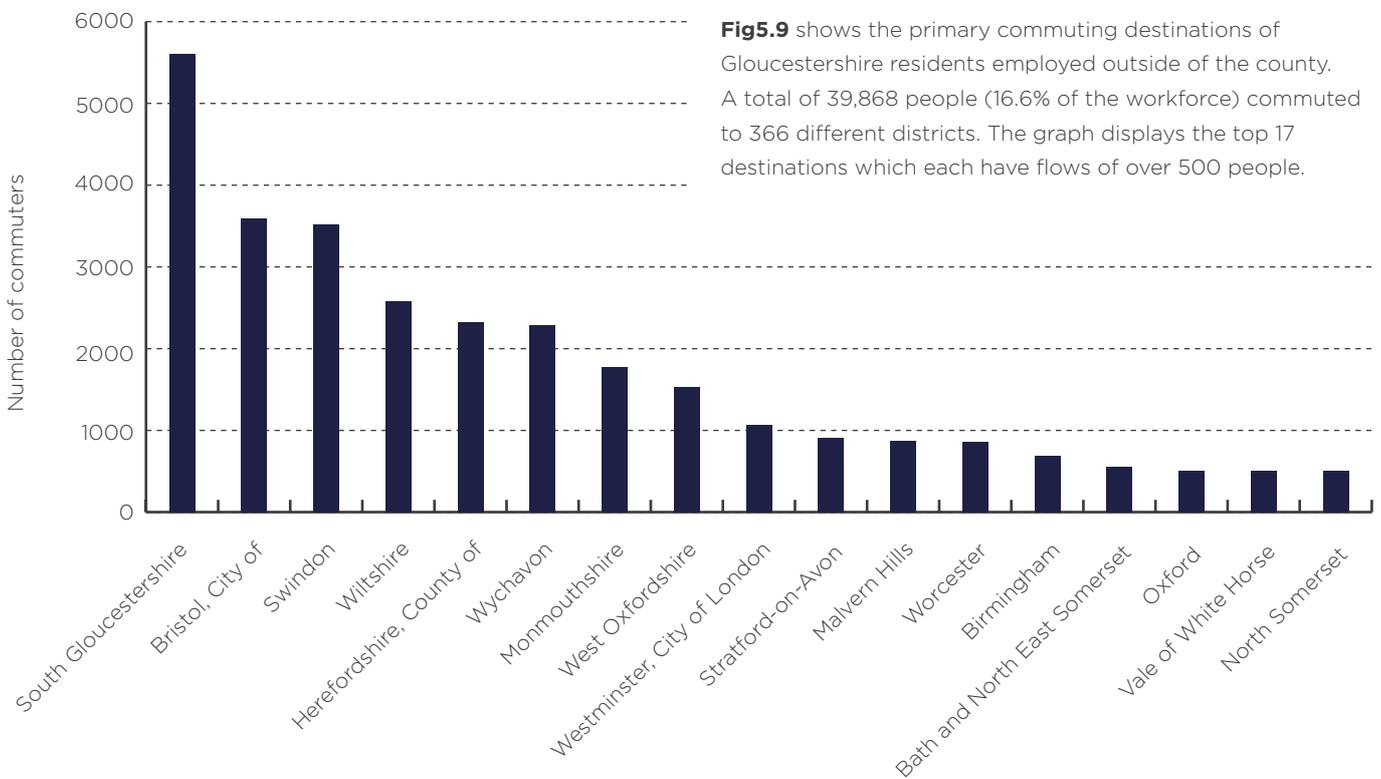**Fig 5.9** Gloucestershire out-commuting destinations with over 500 daily commuters, 2011

Fig5.9 shows the primary commuting destinations of Gloucestershire residents employed outside of the county. A total of 39,868 people (16.6% of the workforce) commuted to 366 different districts. The graph displays the top 17 destinations which each have flows of over 500 people.

All four sub-areas within the West of England LEP area appear in the table, as do both local authorities in Swindon and Wiltshire LEP. Districts within The Marches, Worcestershire and Oxfordshire also appear as popular Gloucestershire destinations.

Fig 5.10 Age profile of Gloucestershire internal commuters and external in-commuters, 2011
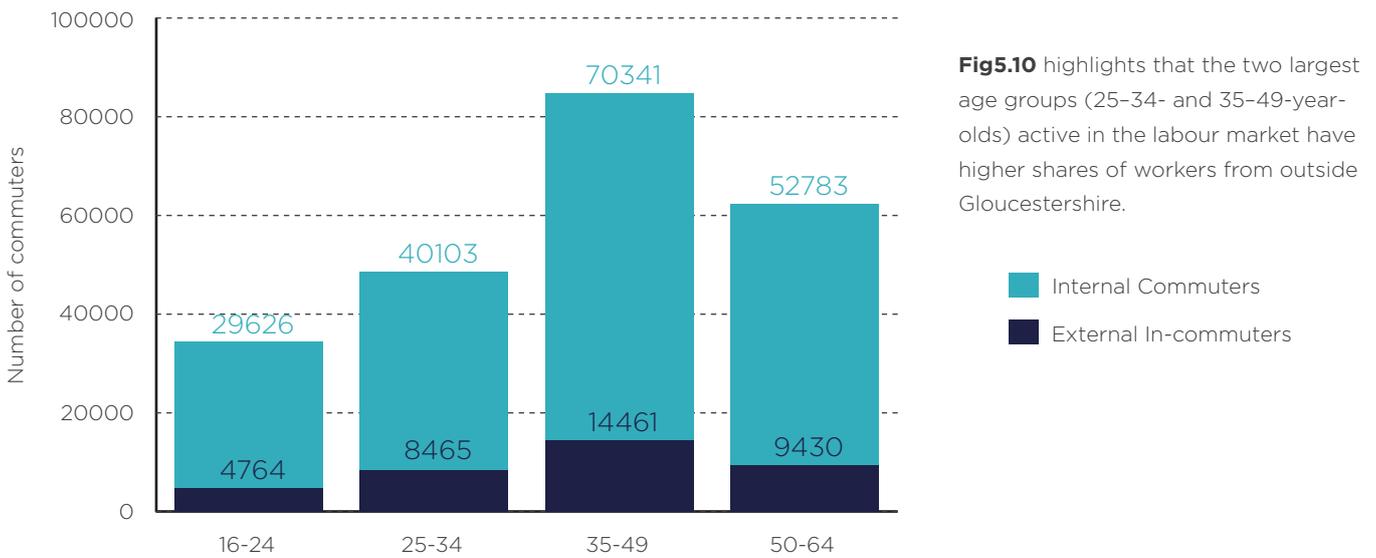

Fig5.10 highlights that the two largest age groups (25–34- and 35–49-year-olds) active in the labour market have higher shares of workers from outside Gloucestershire.

■ Internal Commuters
■ External In-commuters

Fig 5.11 Gloucestershire district dependence on imported labour of different ages, 2011
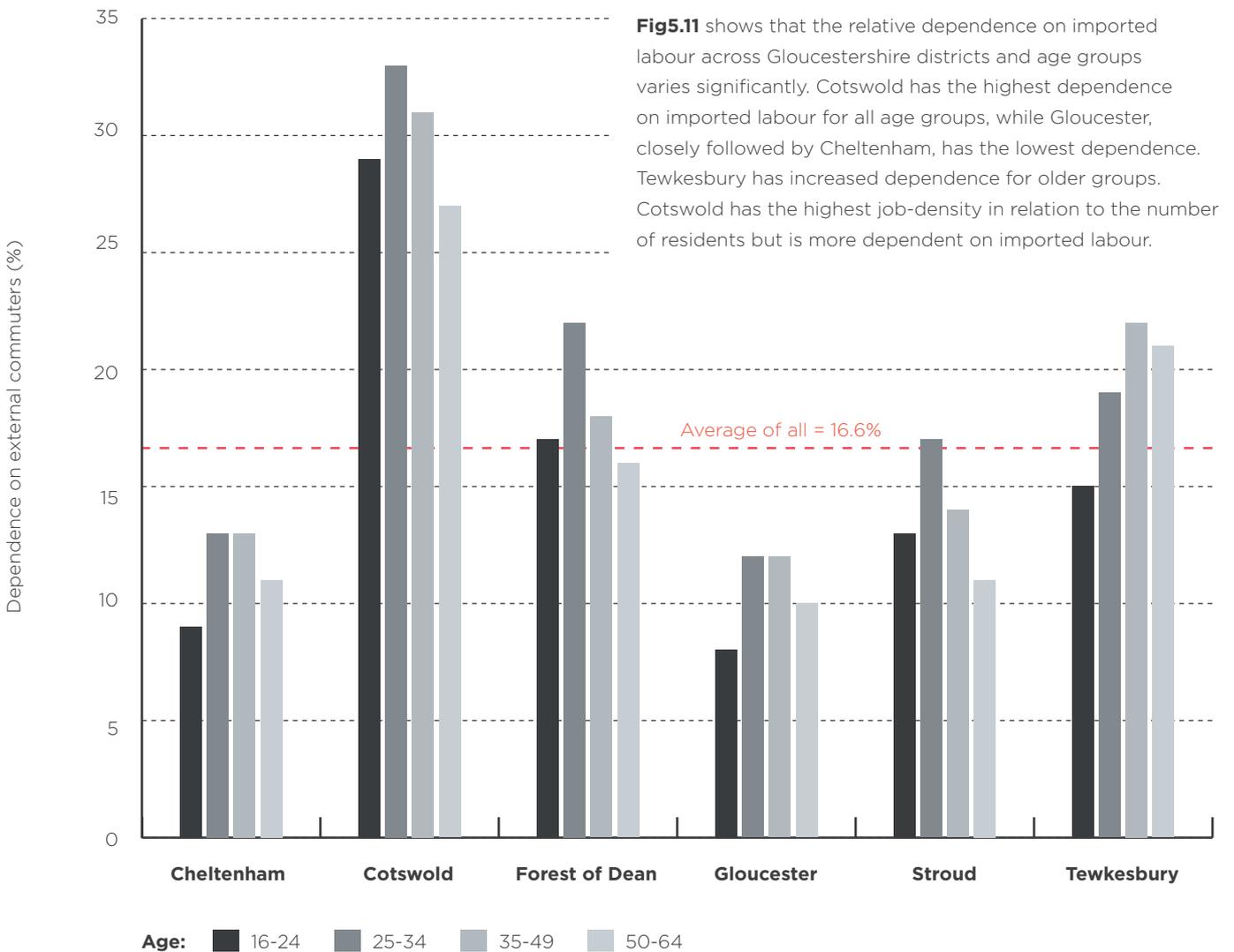

Fig5.11 shows that the relative dependence on imported labour across Gloucestershire districts and age groups varies significantly. Cotswold has the highest dependence on imported labour for all age groups, while Gloucester, closely followed by Cheltenham, has the lowest dependence. Tewkesbury has increased dependence for older groups. Cotswold has the highest job-density in relation to the number of residents but is more dependent on imported labour.

Average of all = 16.6%

Age: ■ 16-24 ■ 25-34 ■ 35-49 ■ 50-64

The Tourism and Visitor Economy in Gloucestershire

Across Gloucestershire a total of 32,410 people (11.4%) are employed in tourism related service sectors. Between 2015 and 2017 the number of tourism employees increased by 14.7%, or 5,740 people.

Fig 5.12 Proportion of local jobs in tourism related sectors, 2017

Proportion of total jobs

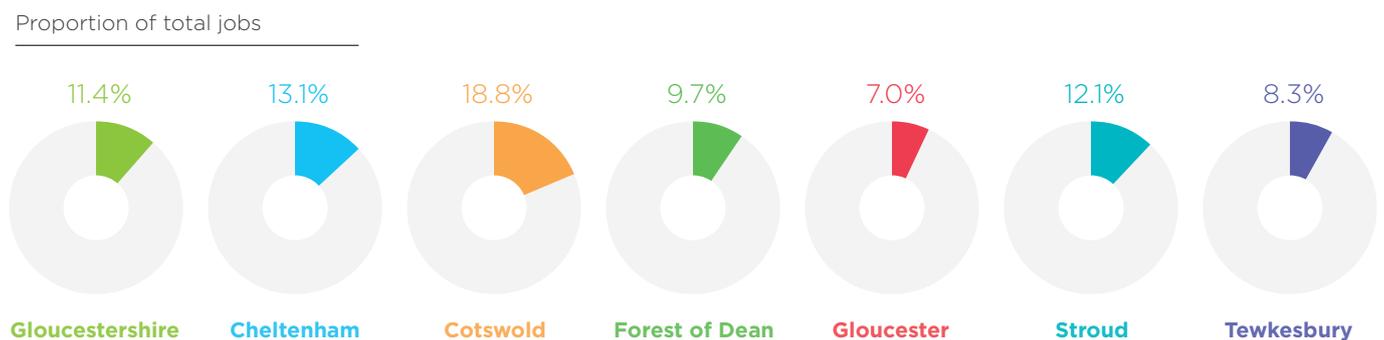| 11.4% | 13.1% | 18.8% | 9.7% | 7.0% | 12.1% | 8.3% |
| Gloucestershire | Cheltenham | Cotswold | Forest of Dean | Gloucester | Stroud | Tewkesbury |

Fig5.12 shows the percentage of total jobs in tourism services within each district. Cotswold has over twice the share of jobs in tourism compared to Gloucester.

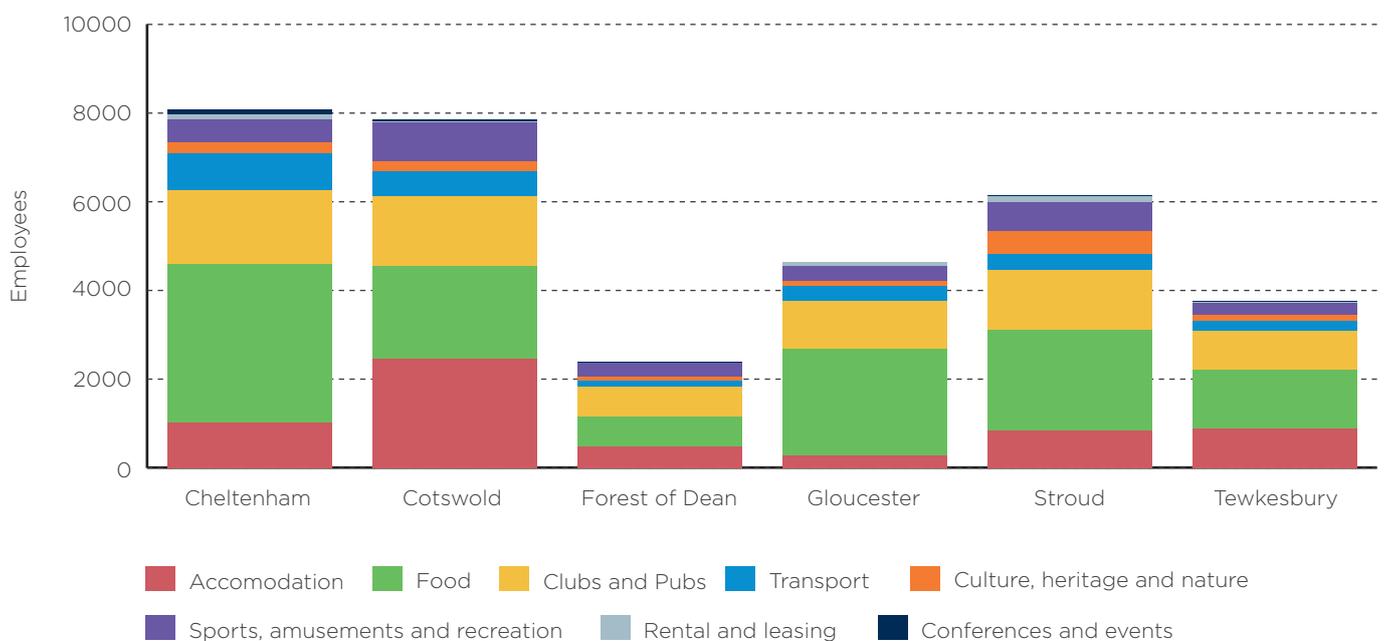**Fig 5.13 Tourism employees by sub-sector and district, 2017**

Fig5.13 highlights the number of people employed across eight tourism sub-sectors in each Gloucestershire district. Food is the largest sub-sector in Cheltenham, Gloucester, Stroud and Tewkesbury. Cotswold has a notably high total share of accommodation employees. The Forest of Dean has the lowest number of employees in all tourism sub-sectors.

Fig 5.14 Composition of total Gloucestershire tourism employment (sub-sector as a per cent of total), 2017

Proportion by Tourism Subsector (%)

- Accomodation
- Food
- Clubs and pubs
- Transport
- Culture, heritage and nature
- Sports, amusements and recreation
- Rental and leasing
- Conferences and events

Fig5.14 shows the totals for the eight sub-sectors across Gloucestershire. Food is the largest sector, followed by Clubs and pubs and then Accommodation. These three sub-sectors account for more than four-fifths of all tourism employment.

Fig 5.15 Growth of tourism sub-sectors across Gloucestershire districts, 2015–17

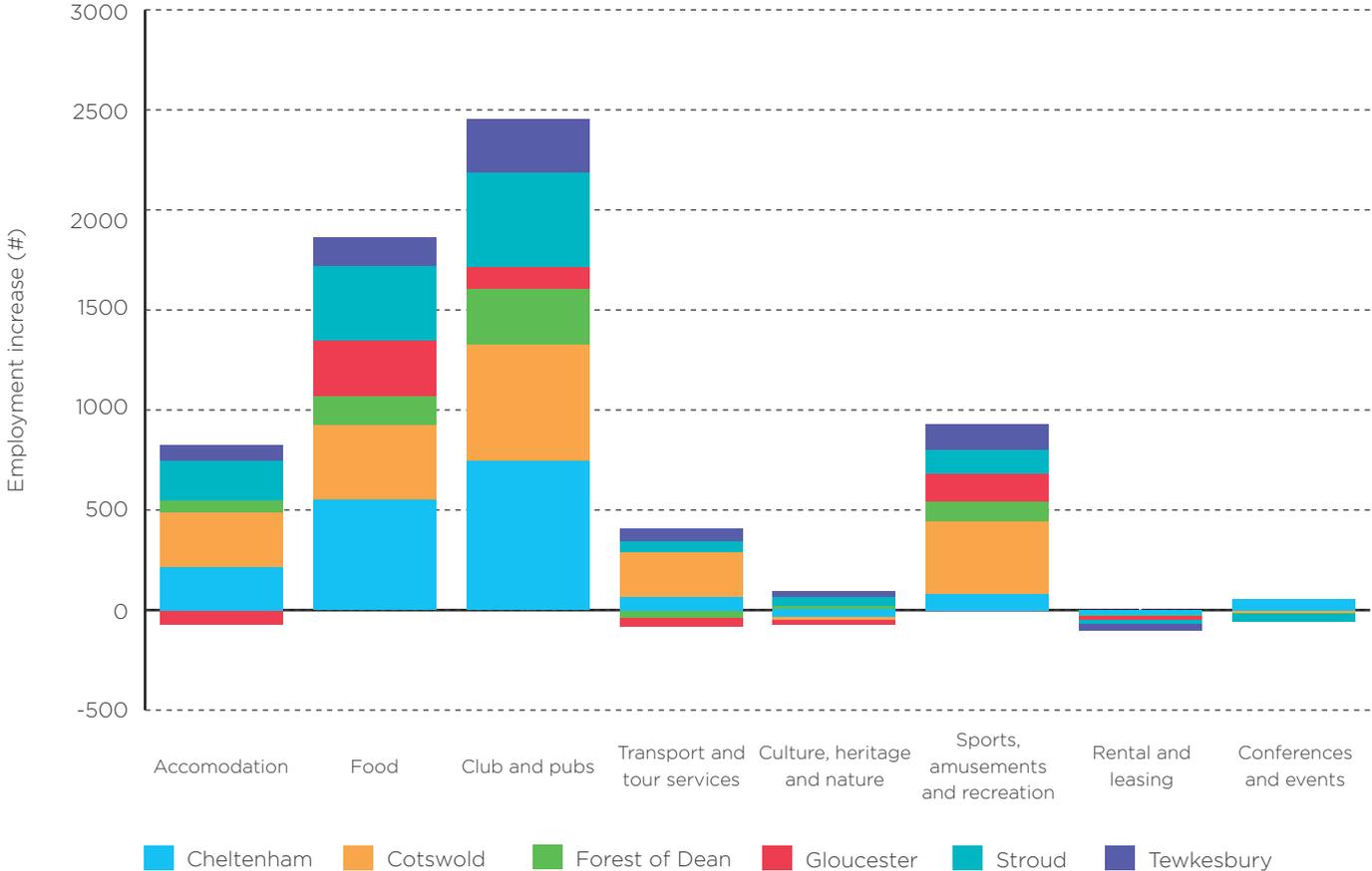Cheltenham | Cotswold | Forest of Dean | Gloucester | Stroud | Tewkesbury

Fig5.15 focusses on the growth of sub-sectors across Gloucestershire between 2015 and 2017, looking at how each district has contributed to sub-sector growth. Accommodation, Food, Clubs and Pubs, Transportation and Sports and Leisure sectors have all shown strong growth – though in Gloucester, Accommodation and Transportation sectors have seen a marginal decline.

Accommodation employment change suggests growth in the number of staying visitors. These tend to spend more and make use of the area's other tourism services such as food, pubs and sport and leisure activities. The Cultural and heritage, and Conferencing and events sectors have seen very marginal and mixed performance with no net change overall in employment between 2015–2017.

Cultural Assets in Gloucestershire

The county plays host to a wide range of cultural, arts, heritage and landscape sites, including but not limited to those highlighted below.

Gloucester Cathedral was completed over 500 years ago, and its origins can be traced back over a millennium. The Cathedral provides a huge draw for religious and non-religious visitors from the county and beyond. It plays a part in Gloucester's modern cultural offer, staging over 110 cultural events a year including the hugely popular Crucible sculpture exhibition organised by Gallery Pangolin. It is currently embarking on a 10-year programme of regeneration and community engagement.

Gloucester City centre contains 707 listed buildings including 37 Grade 1 listed. Among the listed are the Grade 2* listed Gloucester Folk Museum, the Grade 2 listed Gloucester City Museum and buildings on Southgate Street. The Gloucester Guildhall, a Grade 2 listed building, and Blackfriars Priory, a Grade 1 listed building, host an increasingly vibrant programme of music, comedy, film, visual arts, dance, theatre and events at capacities of up to 400.

Cheltenham also hosts a large number of cultural assets, including its famous Regency architecture. The Cheltenham racecourse and Cheltenham festivals are major tourism draws. Cheltenham's historic Everyman theatre, opened in 1891, stages performances all year round, including ballet, opera, drama, dance, comedy, music events and pantomime. Similarly, the Bacon theatre, opened in 1991, stages a range of performance art forms. Cheltenham also hosts a number of museums, including the Holst Birthplace Museum and the Wilson Art Gallery and Museum.

Sports are catered for at several large sports stadia in the county. Kingsholm Stadium is home to Gloucester Rugby and also hosts music concerts. The Jonny-Rocks Stadium is home to Cheltenham Town Football Club.

Rural areas of the county also have various cultural attractions. These include Heritage Railways, such as the Gloucestershire Warwickshire Steam Railway and the Dean Forest railway. In addition to the Cotswold AONB, part of the Wye Valley AONB is on the Forest of Dean border with Monmouthshire and a small part of the Malvern Hills AONB is in north Gloucestershire. A number of the towns and villages across the county are heritage zones, and many have protected centres.

Cotswold Area of Outstanding Natural Beauty (AONB)

The Cotswold AONB is the largest in England, with a total size of 790 sq. miles or 2,038 sq. km. It stretches north to south through Gloucestershire into the surrounding counties. 64% of the total area of the Cotswold AONB is within Gloucestershire, with the majority of this being in the Cotswold District. The map shows the boundaries of the Cotswold AONB, significant surrounding landscape features and Cheltenham, Gloucester and Cirencester.

The Cotswold AONB is a significant positive benefit for Gloucestershire as a place attractive for both residents and tourists alike. The AONB encourages walking and other outdoor pursuits in a unique and distinctive environment. Gloucestershire as a whole is well placed to benefit from this. There is scope to encourage tourists to stay in the area, or to visit one of the larger urban areas as part of their visit to the Cotswold AONB.

The AONB also presents certain challenges. It covers a significant amount of Gloucestershire, reducing the amount of land that is available for development and building. This is particularly relevant as it limits the amount of land available for housebuilding and for commercial development. Finding land to meet Gloucestershire's housing target may therefore be more challenging than in other areas. It might prove necessary to redevelop the lower employment density industrial commercial developments, which make up more than 50% of the total floorspace. This would allow new, higher productivity businesses to move into the area.
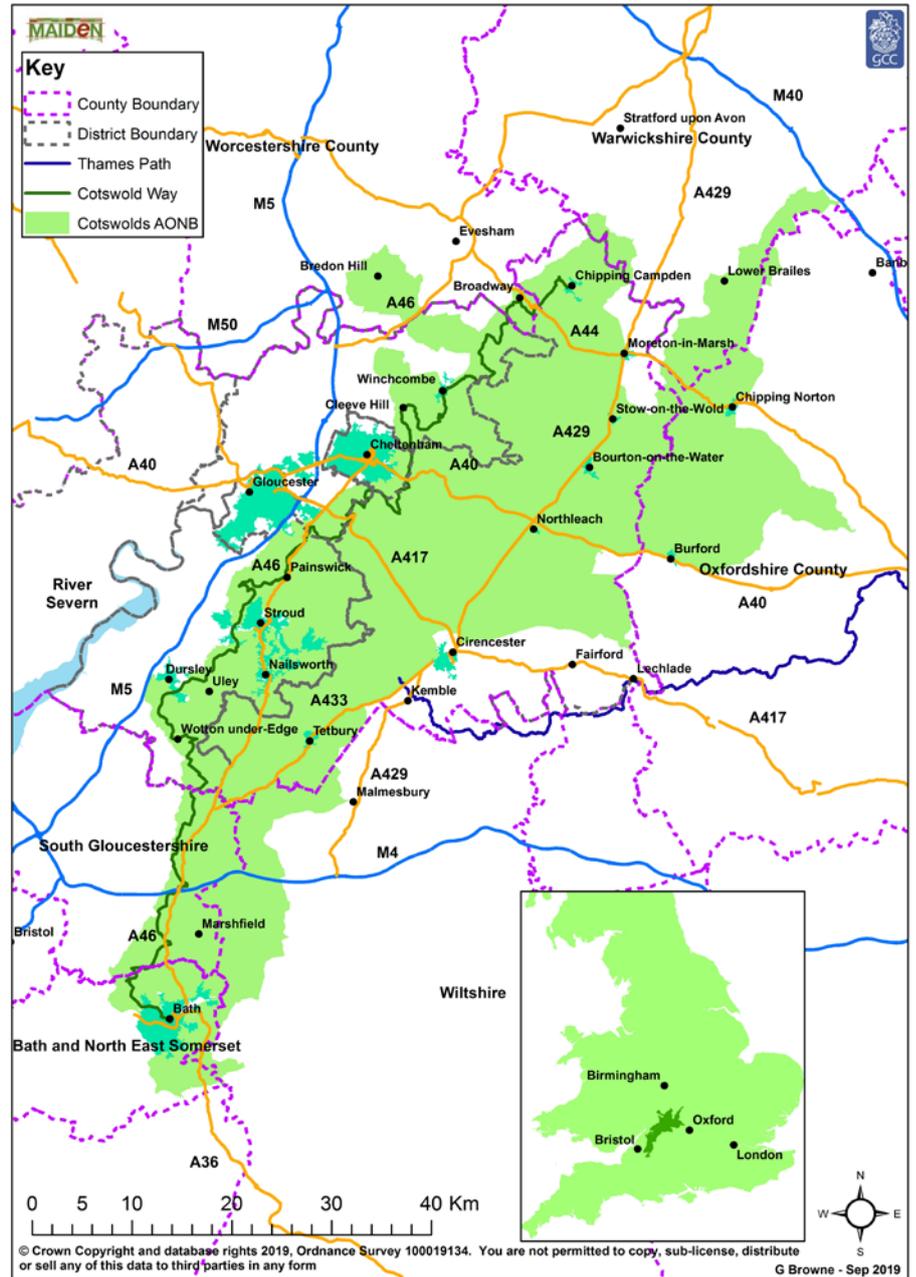
The Cotswold AONB therefore has a significant impact on the economy of Gloucestershire. It is possible that the AONB could act as more of a draw for people to the county, boosting tourism and spending in the local economy, as well as supporting Gloucestershire's reputation as a high quality place to live and work, in order to attract more young people to the county to support business growth.

Index of Multiple Deprivation in Gloucestershire

The Index of Deprivation measures Lower Super Output Areas (LSOA) in England. They are ranked from 1 to 32,844 based on their deprivation relative to another area. Gloucestershire is a mixed area in terms of the Index of Multiple Deprivation. Some parts, in Cheltenham and some more rural areas, are less deprived, while there are some areas, mainly in Gloucester and Cheltenham, which are very deprived. Deprivation is linked to productivity through under-training of the workforce, a reduction in life expectancy and underemployment, among other links.

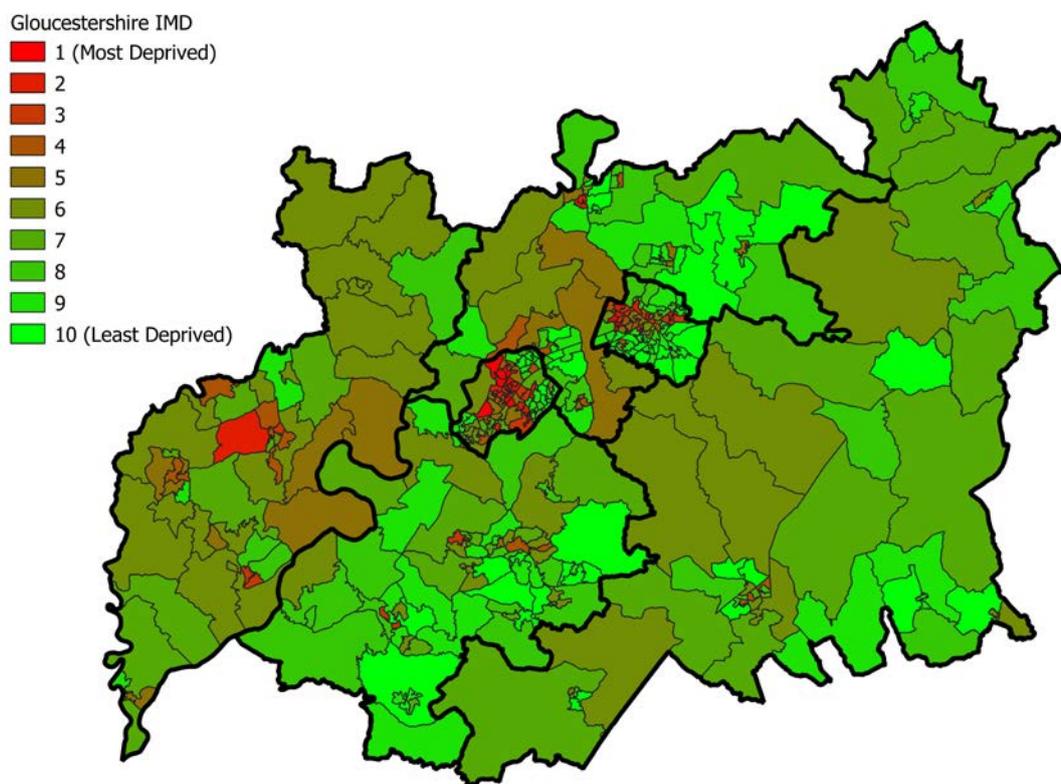**Fig 5.16 Gloucestershire Index of Multiple Deprivation**

Fig5.16 shows the Index of Multiple Deprivation within the area. This shows which decile each Lower Super Output Area falls into, with 1 being the most deprived and 10 being the least deprived. This map shows that the urban areas, particularly Cheltenham and Gloucester, have a mix of high and low levels of deprivation. Deprivation in Gloucester is spread, with the more deprived areas in the west and the less deprived in the east, while in Cheltenham the more deprived areas are in the north and the less deprived in the south.

In contrast, the rural areas are largely, but not exclusively, somewhere in the 40–60% of most deprived neighbourhoods, although there are large areas of limited deprivation. One specific area of high deprivation is the LSOA Forest of Dean 004C in the Cinderford West Ward. This is the most deprived area in the county outside of Cheltenham or Gloucester, ranking 18th in the county and 4540th in the country, where 1 is the most deprived. The area is in the 20% of most deprived LSOAs. It suffers from deprivation issues relating to employment; education, skills and training; and health deprivation and disability. Conversely the least deprived rural area is Cotswold 008C, in the Chesterton Ward near Cirencester.

Fig 5.17 Most and least deprived areas of Gloucestershire

Most Deprived LSOAs	Ward	Local Authority Area	Rank (of 32,844)
Gloucester 004B	Westgate	Gloucester	360
Gloucester 009E	Podsmead	Gloucester	503
Gloucester 011A	Matson and Robinswood	Gloucester	902
Gloucester 002C	Kingsholm and Wotton	Gloucester	1,239
Gloucester 004F	Westgate	Gloucester	1,618

Least Deprived LSOAs	Ward	Local Authority Area	Rank (of 32,844)
Cheltenham 012C	Battledown	Cheltenham	32,768
Cheltenham 013E	Warden Hill	Cheltenham	32,690
Cheltenham 015A	Leckhampton	Cheltenham	32,666
Cheltenham 014D	College	Cheltenham	32,664
Cheltenham 002D	Prestbury	Cheltenham	32,595

Fig 5.17 shows the five most deprived and five least deprived LSOAs in Gloucestershire, with their national ranking. The five most deprived areas in the county are all in Gloucester, while the five least deprived areas in the county are all in Cheltenham. The ten least deprived LSOAs are all in Cheltenham, while the ten most deprived areas in Gloucestershire are a mix of Cheltenham and Gloucester LSOAs.

Appendix 1
Full Data Reference Sources

1. People:

Population and Age Overview and Change 2010 to 2017

1.1   ONS Population Estimates 2017

1.2   ONS Population Estimates 2017 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

1.3   ONS Population Estimates 2017 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

1.4   ONS Population Estimates 2017 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

A Detailed Breakdown of Age in Gloucestershire

1.5   ONS Population Estimates 2017 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

1.6   ONS Population Estimates 2017 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

1.7   ONS Life Expectancy at Birth and age 65 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies

1.8   ONS Life Expectancy at Birth and age 65 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies

1.9   ONS Life Expectancy at Birth and age 65 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies

Population Projections for Gloucestershire

1.10   2016-based Subnational Population Projections ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2016based

1.11   2016-based Subnational Population Projections ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2016based

1.12   2016-based Subnational Population Projections ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2016based

Domestic Population Trends to 2035

1.13   2016-based Subnational Population Projections ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2016based

1.14   2016-based Subnational Population Projections ONS https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2016based

Ethnicity in Gloucestershire

1.15   ONS Census 2011 https://www.nomisweb.co.uk/census/2011

1.16   APS 2018 (12 months to Dec 2018) https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi

1.17   Census 2011 https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/datasets/2011censussmallpopulationtablesforenglandandwales

Economic Activity in Gloucestershire 2010 to 2018

1.18 ONS Annual Population Survey 2018 (12 months to December 2010), (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.19 ONS Annual Population Survey 2018 (12 months to December 2010), (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.20 ONS Annual Population Survey 2018 (12 months to December 2010), (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.21 ONS Annual Population Survey 2018 (12 months to December 2010-2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

Economically Inactive Population of Gloucestershire

1.22 ONS Annual Population Survey 2018 (12 months to December 2010-2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.23 ONS Annual Population Survey 2018 (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

Skills and Occupations of the Economically Active in 2018

1.24 ONS Annual Population Survey 2018 (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.25 ONS Annual Population Survey 2018 (12 months to December 2010), (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

1.26 ONS Annual Population Survey 2018 (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

Skills and Occupation Changes 2010 to 2018

1.27 ONS Annual Population Survey 2018 (12 months to December 2010), (12 months to December 2018) https://data.gov.uk/dataset/03c158ef-4952-43ff-b441-7571541c6229/annual-population-survey-economic-activity-by-age-and-gender

Projected Employment Trends to 2036

1.28 Local Economic Forecasting Model LEFM – Round 181 Cambridge Econometrics https://www.camecon.com/how/lefm-model/

1.29 Local Economic Forecasting Model LEFM – Round 181 Cambridge Econometrics https://www.camecon.com/how/lefm-model/

School Forecasts for Gloucestershire

1.30 Gloucestershire internal calculations (Gloucestershire County Council)

1.31 Gloucestershire internal calculations (Gloucestershire County Council)

Key Stage 4 and Key Stage 5 Destinations and Apprenticeships

1.32 Gov.uk official Statistics Destinations of Key stage 4 and 5 pupils 2017 https://www.gov.uk/government/statistics/destinations-of-ks4-and-ks5-pupils-2017

1.33 Gov.uk official Statistics Destinations of Key stage 4 and 5 pupils 2017 https://www.gov.uk/government/statistics/destinations-of-ks4-and-ks5-pupils-2017

1.34 Gov.uk Apprenticeships and Traineeships Data 2019 https://www.gov.uk/government/statistical-data-sets/fe-data-library-apprenticeships

STEM Skills in Gloucestershire

1.35 BIS/BEIS Mapping Local Comparative Advantages in Innovation 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/546999/bis-15-344-mapping-local-comparative-advantages-in-innovation-framework-and-indicators.pdf

Graduate Retention in Gloucestershire

1.36 BIS/BEIS Mapping Local Comparative Advantages in Innovation 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/546999/bis-15-344-mapping-local-comparative-advantages-in-innovation-framework-and-indicators.pdf

1.37 BIS/BEIS Mapping Local Comparative Advantages in Innovation 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/546999/bis-15-344-mapping-local-comparative-advantages-in-innovation-framework-and-indicators.pdf

Earnings in Gloucestershire

1.38 Annual Survey of Hours and Earnings (ASHE) 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualsurveyofhoursandearningsashe

1.39 Annual Survey of Hours and Earnings (ASHE) 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualsurveyofhoursandearningsashe

1.40 Annual Survey of Hours and Earnings (ASHE) 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualsurveyofhoursandearningsashe

2. Ideas

Business Expenditure on Research and Development

2.1 ONS BERD Survey 2018 https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businessenterpriseresearchanddevelopment/2017

2.2 ONS BERD Survey 2018 https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businessenterpriseresearchanddevelopment/2017

2.3 ERC report on innovation https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businessenterpriseresearchanddevelopment/2017

Spending and Innovation

2.4 2HERD by LEP 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/489484/BIS-15-345a-mapping-local-comparative-advantages-in-innovation-data-part1.xlsx

2.5 HERD by LEP 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/489484/BIS-15-345a-mapping-local-comparative-advantages-in-innovation-data-part1.xlsx

Higher Education Spending on Research and Development

2.6 HERD by LEP 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/489484/BIS-15-345a-mapping-local-comparative-advantages-in-innovation-data-part1.xlsx

Patents in Gloucestershire

2.7 ONS Patents open Data July 2018 https://www.gov.uk/government/publications/ipo-patent-data

Ideas Spotlight: Innovate UK Funded Projects in Gloucestershire

2.8 Gov.uk Innovate UK funded projects since 2004 https://www.gov.uk/government/publications/innovate-uk-funded-projects

2.9 Gov.uk Innovate UK funded projects since 2004 https://www.gov.uk/government/publications/innovate-uk-funded-projects

3. Infrastructure

Gloucestershire Rail Links and Usage

Table: Office for Road and Rail Estimates of station usage 2017-18 https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage/

Housing

3.1 Gov.uk Live tables on Dwelling Stock 2019 https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants

3.2 Gov.uk Live tables on Dwelling Stock 2019 https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants

3.3 Gov.uk Live tables on Dwelling Stock 2019 https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants

3.4 Gov.uk Live tables on Dwelling Stock 2019 https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants

3.5 District Local Plan data

Housing Affordability and Tenure

3.6 Housing Affordability in England and Wales 2018 https://www.ons.gov.uk/peoplepopulationandcommunity/housing/bulletins/housingaffordabilityinenglandandwales/2018

3.7 Housing Affordability in England and Wales 2018 https://www.ons.gov.uk/peoplepopulationandcommunity/housing/bulletins/housingaffordabilityinenglandandwales/2018

3.8 Local Authorities of Gloucestershire SHMA March 2014 https://www.stroud.gov.uk/media/1740/gloucestershire_shma_2014.pdf

3.9 Local Authorities of Gloucestershire SHMA March 2014 https://www.stroud.gov.uk/media/1740/gloucestershire_shma_2014.pdf

The Commercial Floorspace Composition in Gloucestershire

3.10 ONS NDR Commercial and business floorspace in England and Wales; VOA 2016 https://www.gov.uk/government/statistics/non-domestic-rating-business-floorspace

3.11 ONS NDR Commercial and business floorspace in England and Wales; VOA 2016 https://www.gov.uk/government/statistics/non-domestic-rating-business-floorspace

3.12 ONS NDR Commercial and business floorspace in England and Wales; VOA 2016 https://www.gov.uk/government/statistics/non-domestic-rating-business-floorspace

3.13 ONS NDR Commercial and business floorspace in England and Wales; VOA 2016 https://www.gov.uk/government/statistics/non-domestic-rating-business-floorspace

4. Business Environment

The Structure of the Gloucestershire Business Base

4.1 ONS Business Counts 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation

4.2 ONS Business Counts 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation

4.3 ONS Business Counts 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation

4.4 ONS Business Counts 2018; ONS Business Register and Employment Survey https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

Start-ups and Entrepreneurialism in Gloucestershire

4.5 ONS Business Demography 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

4.6 ONS Business Demography 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

4.7 ONS Business Demography 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

Start-ups and Survival Rates in Gloucestershire

4.8 ONS Business Demography 2018; ONS mid-year population estimates https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable, https://beta.ons.gov.uk/datasets/mid-year-pop-est/editions/time-series/versions/4

4.9 ONS Business Demography 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

4.10 ONS Business Demography 2018 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

Business Formation and Decline

4.11 ONS Business Demography 2017 https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/businessdemographyreferencetable

Gloucestershire Employees and Employment Demand by Sector

4.12 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

4.13 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

4.14 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

Job Vacancy Trends and Skills Shortage Vacancies in Gloucestershire

4.15 Employer Skills Survey 2017 https://www.gov.uk/government/publications/employer-skills-survey-2017-uk-report

4.16 Employer Skills Survey 2017 https://www.gov.uk/government/publications/employer-skills-survey-2017-uk-report

4.17 Employer Skills Survey 2017 https://www.gov.uk/government/publications/employer-skills-survey-2017-uk-report

Vacancy Analysis by Sector within Gloucestershire

4.18 Employer Skills Survey 2017 https://www.gov.uk/government/publications/employer-skills-survey-2017-uk-report

4.19 Employer Skills Survey 2017 https://www.gov.uk/government/publications/employer-skills-survey-2017-uk-report

Dynamic Trend Analysis of Business and Employee Performance

4.20 ONS Business Counts & Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

Services Exports from Gloucestershire

4.21 International trade in services, UK 2017 https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/bulletins/internationaltradeinservices/2017

4.22 International trade in services, UK 2017 https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/bulletins/internationaltradeinservices/2017

Value of Exports

4.23 International trade in services, UK 2017 https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/bulletins/internationaltradeinservices/2017

5. Place

Rural Productivity and Agriculture in Gloucestershire

5.1 Defra rural productivity analysis 2018 https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/exploringlabourproductivityinruralandurbanareasingreatbritain/2014

5.2 Defra rural productivity analysis 2018 https://www.gov.uk/government/statistics/total-factor-productivity-of-the-agricultural-industry

5.3 Campden BRI, Royal Agricultural University 2018; and DeFRA 2018 Farm Diversification Trends in England https://www.gfirstlep.com/downloads/2019/the-gloucestershire-agrifood-and-rural-economy-final-report-apr-2019.pdf

Gloucestershire Commuting Choice

5.4 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.5 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.6 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.7 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

Commuting in Gloucestershire

5.8 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.9 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.10 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

5.11 ONS Census 2011 https://www.nomisweb.co.uk/census/2011

The Tourism and Visitor Economy in Gloucestershire

5.12 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

5.13 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

5.14 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

5.15 ONS Business Register and Employment Survey 2018 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey

Cultural Assets in Gloucestershire

Gloucester City Council Cultural Assets Report https://www.gloucester.gov.uk/media/1372/cultural-strategy.pdf

Cotswold Area of Outstanding Natural Beauty (AONB)

Picture: Cotswold AONB Management Plan 2018-2023, Gloucestershire County Council.

Index of Multiple Deprivation in Gloucestershire

5.16 Index of Multiple Deprivation 2015 https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015

5.17 Index of Multiple Deprivation 2015 https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015

Appendix 2 – Error Bars

Error bars indicate the level of confidence for each value on a graph. Longer/wider intervals mean more uncertainty. When two intervals do not overlap it is reasonably certain that the two groups are truly different.

The Annual Population Survey used in Fig1.22, and the Annual Survey of Hours and Earnings used in Fig1.39, are sample surveys. They provide estimates of population characteristics rather than exact measures. In principle, many random samples could be drawn, and each would give different results, since each sample would be made up of different people who would give different answers to the questions asked.

gfirst LEP
growing gloucestershire

SHARED INTELLIGENCE